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RASTER BLASTER Video Pinball for the Apple II

See next month's issue for full details.

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No 1 November 1981

Try to think of something more exciting than a computer. What did you 1 by to think of something more exciting then a computer, when did you come up with: A trip up the Amazon, scating a good for England, landing come up with: A trip up the Amazon, scoring a goal to on Mars or, maybe, beating the bank at Monte Carlo?

Mars or, maybe, beating the bank at Monte Cano? A computer will give you the chance to do any of these in your own.

ring room. And it you came up with some more illicit excitement, then perhaps you

And it you came up with some more littid excitement, then perhaps you about be put in touch with a businessman I met who sends his programs. at in plain brown wrappers! Supprised? Then COMPUTER & VIDEO GAMES is the magazine to tell you living room. burprised? Then COMPUTEN & VIDEO GAMES is the magazine to tell you just what you're missing out on. If you have clready discovered computers. just what you re missing out on. if you have careasy discovered computers you will know that their only limitation is the programmer's imagination. you will know that their only limitation is the programmer's imagination.
COMPUTER & VIDEO GAMES is out to push your imagination to its limits. OMPUTER & VIDEO GAMES is out to push your imagination to its limits.

This magazine is putting the accent tirmly on the "games" side. We are

This magazine is putting the accent tirmly on the "games" side. We a not commenting on computers as hardware, but as a means to an end-

nd that end is entertainment. This is the age of the microchip and if you are not making the most of it. and that end is entertainment. Whether you use chips in pub and arcode video games, buy them in toys this is the age of the microchip and it you are not to COMPUTER & VIDEO GAMES aims to show you how. Whether you use chips in pub and areade video games, buy them in toy for your children, play through them on a TV video games centre, or have for your children, play through them on a 14 video games centre, or have them hidden away inside pour computer, we will help you to make more of

eem. In return we will be looking for some help from you in supplying views. in return we will be looking for some neighton you in supplying years, ideas and — most importantly — games listings for us to print, page 55 has ideas and — most importantly—games ustings for us to print: rage to more details on how to send in copy and the rewards we are offering. them.

over details on how to send in copy and the research we are othering.
We want you to get the most out of these listings that you possibly can. So We want you to get the most out or these limings that you possibly can. 5, don't lust turn over pages which aren't seduring your particular machine's don't just turn over pages which aren't teararing your particular machin Basic. Instead. look to see how other people have got around problems dotic. Instead, look to see how other people nave got ground problems which may have buffled you and if a game interests you then try to convert

to your machine. Our Down to Basic page won't only teach beginners how to use this Our Down to Basic page won't onty teach beginners how to use this language but compare each machine's Basic lunctions and show which does it to your machine.

nce job on each machine. If there are any terms you don't understand turn to our software glossary each job on each machine.

If there are any terms you don't understand turn to our sor (pages 97 and 96) and you should find an explanation there. orges y/ and set and you should then an explanation there.
Delted around the magazine are the Bugs — you'll meet them officially on Dotted ground the maggaine are the Mugs.—You'll meet them officially of page 58. We've already fallen in love with these creations from the pen of page 55. We've already tallen in love with these creations from the pen of Eighin Lloyd-Jones and we loop you will too I'm sure they would like to join departs useryouses and we hope you will too. I'm sure they would like to me now in offering you a big welcome to COMPUTER & VIDEO GAMES.

Editor Terry Pratt Assistant Editor Elepath Joiner Editorial Assistant Susan Campone Art Director Paul Flint Design Linda Freeman, Chris Kanolka, Mike Ruffs Hustrator Gary Scrace Advertisement Manager Simon Teager

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NEXT MONTH NEXT MONTH

Bubbling under, our December issue. How will we keep this off the streets for a whole month

Your very own page. But do you have anything to say

Commetitions

Dan you tell an invader from a galaxian? Can you
Solve our free puzzle? Are you an arcade king? Then

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ARCADE ACTION Showing soon on your local screens . . . the latest in pub and arcide names

Computers already have the edge in this popular game. Tom Nacier offers the tips

32 THE INVADERS
The aliens are as mean as ever on a Nascom 2 36 SUPER NIM
Take on your Apple at this updated strategy game

RAINROW PASSAGE 42 RAINBOW PASSAGE
A tactical board game is brought to colourful life on
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ved!

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Also in our oh-so seasonal December issue we will continue our invaluable guide to the microprocessor controlled toys and games which you and your children could be playing with on Christmas morning.

read our rundown of what to

The new year also promises to be an exciting time in the arcade games world with a new generation of machines due out. Make sure you keep up to date with your local screens.

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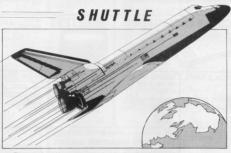
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The attraction of this simulators is the abheticity, So for an a possible, if follows the actual parameters of the instructional first columbia (light with only one or two miner acceptable). The shuttle, occurre, starts is little) provided vertically into the sky and carrier a huge feet that to provide the fuel for its three main engines in addition to the vertically into the sky and carrier a huge feet that to provide the fuel for its three main engines in addition to the representations of the start of th

The simulation may be started at one of three points in time: either at take off, at a point where the Columbia is in a stable orbit round the earth, or finally, prior to landing. Measurement of speed, the and so on may be selected for either Metric or imperial measurements. All of the physical forces which acted upon the actual flight are taken into account. One departure from fact has been included in that the two solid feel robests have had their thrusts increased from 26 to 56 million Newtons so as to give the pilot an increased latitude for error. In other words to make the take off easier.

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named "Mysterious Adventures" is written in machine language by B. Howarth, an English author. The first episode is entitled "The Golden Baton". The scenario is that you have been sent by the ruler of your own land to a strange province with the mission of discovering the whereabouts of the legendary Golden Baton of Ferrenuil, a strange province with the mission of discovering the whereacouts of the logerically discovering about the first state. Or retrement, King of the Ancient Elf Kingdom. The baton mysteriously disappeared several years ago and whilst others have ventured to the land in an attempt to discover it, none have returned to tell their tale!

The program follows what has become the normal structure for Adventure programs. Like the original mai frame Adventure, directions can be designated by just the first letter of the compass point and commands may be optionally entered with just the first three letters of the appropriate word. As usual provision is made for saving the game at any stage and such standard commands as Help, Inventory, Score and Quit are all available. Experienced adventurers will inevitably draw comparisons between this series and that of Scott Adams, so we Experienced adventurers will mentative draw comparisons between this series and that or scott Agams, so we will leave it to them to make their judgements! The only comment that we will make at this time is that we find it quite invigorating to play an Adventure game by a different author as obviously they construct their stories. slightly differently. Mysterious Adventure 1, "The Golden Baton" is available on cassette for TRS-80 or Video Genie machines of 16K or more and on disk for 32K up machines. It occupies a full 16K. The tape versions save their game to tape and the disk to disk.

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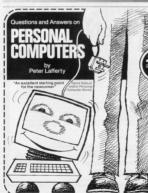
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Ripper investigation: then there was the time we used the VisiCalc program to predict the whereabouts of Lord

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MAILBAG

TAPING THAT SINCLAIR PROBLEM

Door Sir

Sinclair claims that the ZX81 will accept a tape input from any cassette recorder with either a 4 ohm or 8 ohm output. This may be true but for some reason I have found it impossible to reload my own programs once they have been recorded. Why is this?

Puzzled,

London N7.

Our resident expert replies: Most portable tape machines these days have two sets of inputs and outputs. One set will be a S-pin DIN standard socket. He ZXBI but cannot be used to reload. The other set will be a poir of 3.5 millimetre jack sockets. One will be for the microphone and marked "MIC" and the other will, hopefully, be the 4 other will, hopefully, be the 4 but will hopefully be used to load programs.

Leading to the control of the computer one of the computer one of the computer one of the computer one of the control of the c

THIS is a page of opportunity. Well sited in the magazine with plenty of room for expansion and soon to have lots of exciting places for screen-tired eyes to visit.

With a little building up the views should be good as well. If you have a homeless letter bubbling up inside you or even a whole family of correspondence looking for a nice area to settle. Why not send them along to us at Mailbag and we'll do our best to find a good home for them.

Problems, comments, ideas and even criticism can find a place here. If you are interested please drop a line to: the editor, Computer & Video Games, EMAP, Durrant House, 8 Herbal Hill, London ECIR S.ID.

SJD. Well you didn't have much chance to write to us before this first issue so we put together some letters of our own, by asking the North London Computer Club for two of the problems they have been faced with and then providing answers to them. It was all a bit too easy so we hope you'll test us

some more in the future.
cassette machine out of the win-

Sinclair suggest that if you cannot get the program to enter you should vary the volume level until the ZX81 accepts the signal. Once you have pressed LOAD and RETURN the computer will

signal it recognises so you do not have to hurry if you have a long enough program on the tape

If you are able to load a program but find it corrupted try turning the volume level down as this may be distorting the signal. Also check the state of the batteries, if you are using them, or, preferably, use a mains adaptor if you can.

INFURIATING KIT CLANGER

Dear Sir,
One of the most infuriating mistakes I have seen with kit

mistakes I have seen with kit building is incorrect component insertion.

Not only are components in the wrong places but they are also

Not only are components in the wrong places but they are also put in the wrong way round. While excuses can be made for components with unrecognisable markings e.g. capacitors, diodes or transistors, they cannot be made for chips especially when boards are marked with the layout.

Angry, North London.

Our kit correspondent replies:

I too have found a problem with chip identification recently which has made me look again at the subject. Most good kits or self-assembly boards are supplied with a good diagram indicating the correct position of each chip. Some, however, do not and just specify the end or corner with the "dot" that corresponds to pin 1. This, in some cases, is not enough.

Most chips are configured as shown below. This shows a cutout, A, a recessed hole, B, and the "dot", C. Pin I is clearly indicated by the "dot", C. In figure 2, however, C is omitted and the recessed hole, B, could be mistaken for the "dot".

A BO



The safest method I have found is to combine A and C to indicate the top of the chip and depend on either if the other is missing. Pln I is then always to the left if the chip is pin down on the table and the cutout. A and/or the "dot", C, are away from you.



WIN A TAITO SPACE INVADERS OF YOUR OWN

Imagine having a Taito space invaders machine of your very own. It could be the centrepiece of your living room or plugged into your hedroom.

That is the marvellous prize which Taito has kindly put up for the winners of the Know your Creatures Competition.

The arcade game industry recognises space invaders as a oneoff success and it is convinced there will never be another game like it. The way it caught people's imaginations make it a classic of its kind. A success that no amount of new machines will ever reneat. If you win this prize you will have more than just an



enthralling game in your living room but a slice of the world's leisure history.

Do you remember that first game of space invaders? It was probably back in 1979 when Britain first went space invaders crazy. I can recall struggling with the tactics of this bizarre game in a South London pub.

Without any idea of whether it

think the first creature comes from a Puckman or Mazeman machine then write either word beside him - we will know what

you mean. Then answer the question below in not more than 25 words and cut out this section of the magazine but do not post it vet.

Hang on to it! For in our December and January issues there will be another three graphics characters and then another three. When you think you have all nine then send the three sections back to us.

This gives you time to hunt around your local arcade if there is a creature you are not sure of and make certain of the right answer. The first correct answer picked out of the hat will have that space invaders table.

was worth shooting the flying saucers that soared across the top of the screen or whether I should go for the space invaders on the edge, or that bottom row. I was wiped out long before the first wall even looked like being cleared

Feeling certain I could improve on my meagre score I was already reaching for that next Inn before I noticed that a good number of coins had already accumulated on top of the machine and that half the pub was lined up behind me waiting to have a go.

It is a measure of just how addictive space invaders is that I scoured the pubs for another machine for weeks.

My dream then was to have a space invaders machine of my very own, so that I didn't have to wait for a free machine in pubs or keep travelling up to the bar for my change.

Now for one lucky reader. Taito - the name behind the original space invaders craze will make that dream come true.

With such an opportunity, you could soon be rivalling the top scores of the video game world champions.

For details of the Know Your Creature Competition, see below.

HAVE YOU KILLED ONE OF THES

Do you know a space invader from a galaxian? Or can you tell an Asteroid spacecraft from a Phoenix one? If so then you could find your-

self owning a Taito space invaders machine. Anyone who knows his pub and arcade game machine characters will be in with a chance of showing off a space invaders table to visiting friends.

If you can put a name to the three creatures shown below then you will be well on your way to having that prize in your living room.

All you have to do is write beside each picture below what machine that particular creature features in. For example if you

KNOW YOUR CREATURES/1







Name Address

Telephone:

I THINK SPACE INVADERS PROVED SO POPULAR BECAUSE:

THE LATEST, AND INDEED THE GREATEST OF THE KANSAS ARCADE SERIES

RCADE SCRAMB



Don't waste your time playing the simple starts to the Big Five games - get straight into the heavy action with this brand-new multi-action, home grown 'Arcade' game,

Yes, it's the famous one of the Arcades, and the first time it's ever been achieved on a computer

Not that easy though, for without warning suddenly there's a squadron of enemy fighters heading straight at you hell bent on your destruction. Then comes the ack-ack flung at you from the ground batteries to add to your difficulties, and there's the cluster of blimps to make things even more difficult.

But the real pasties are the rockets, which the enemy blast at you, without warning, from the ground

Even if you manage to out-shoot, out-fight, out-manoeuvre that little lot, you still have the mountains to negotiate which is a problem with the fighters streaming through the only available space. But with this really unbelievable game, you have no less than six different controls at your fingertips, being

able to move your homber forward, backward, up and down, whilst at the same time both firing your guns at the enemy and bombing the installations. And not only do you have infinite control over the bomber, but the ground and enemy installations

continuously unfold below, with valleys and mountains actually moving across the screen, giving an hitherto undreamed of realism

The installations include rocket launch pads, ack-ack batteries, forts, munition dumps and fuel dumps. You do your damnedest to destroy these as they unfold below, so building up your score. The famed Mike Chalk who created Arcade Invaders and U-Boat Strike, has teamed up with Chris Smyth to

create this fantastic machine language Arcade game. There is so much happening it really is unbelievable with sound adding to the realism of this ultra-fast moving game. £9.50

Programs are for the Tandy TRS 80 and Video Genie. All prices are VAT paid and postage free. Sam day return first class post service. All software fully guaranteed and in stock as we are the actual publishers, not the retailers. Free catalogue upon request. KANSAS CITY SYSTEMS, UNIT 1, SUTTON SPRING WOOD, CHESTERFIELD S44 5XF

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COMPETITION

TAKE ON THE ARCADE World

If you are blasting more galaxians per 10p than anyone else down your local... isn't it about time you displayed this talent to the world?

Whatever your favourite machine, send us in your best score and you could find yourself hailed as the Best Arcade Game Player in the World. In conjunction with Taito Elec-

In conjunction with Taito Electronics we are trying to find the best galaxian-blaster, puckman muncher, asteroid annihilator or invader halter going — and give him the acclaim he is due.

The competition is very easy to enter, simply turn to the reader reply card between pages 82 and 83 and fill it in. You will find a section of questions on arcade games which will give us a better idea of what you want from arcade games and we, in turn, can help manufacturers we come in contact with, to provide those sort of games.

Next fill in the machine you wish to enter on and take the card down to your local pub or arcade. Put the best score you can on the machine, ask the pub or arcade owner to sign it and send if off to us.

Should you find yourself pro-

ducing a disappointing score simply try again.

If, after you have sent the card

off, you turn in an even better score, don't kick yourself but just buy the next issue of Computer & Video Games and there will be another entry form in there.

The highest scores on the 10 most popular machines will appear in our Arcade Action section to give the rest of the arcade world something to aim at.

And the three top scorers on

And the three top scatters on the three most popular machines we hear from by 1 January will be invited to take part in our Grand Arcade Game Final. So don't hide that expensivelyobtained talent under a bushel — tell the world about it.



A VIC-20!

Can you solve the tantalizing puzzle attached to our front cover?

There is a solution (you may begin to doubt this after the first three hours), but only one.

The aim of the puzzle is to set out the four cards in a close approximation of a square so that two sides of each card lie

COMPETITION RULES

COMPUTER & VIDEO GAMES' many free competitions are open to anyone except EMAP employees and their relatives. Entries to our Mind Routines.

Nevera Crossword, Know Your Creature, Free Puzzle Program, Game of the Year and Arcade Player of the World competitions, should be sent to: COMPUTER & VIDEO GAMES, Durrant House, 8 Herbal Hill, London ECIR SJB. Judges' decisions are final and no correspondence can be entered into.

Send entries to Mind Routines on a postcard and in all cases please include a name, address and, where possible, a phone number — so we can let you know should you have won.

See the photograph above.

And the four places where

And the four places where these cards meet must all match up. That sounds easy enough until you actually start work on the puzzle and find that never more than three sides seem to match. This is where your mic-

recomputer comes in.

If you can write a program on whatever sort of machine you own — or just ordinary Basic — and send it in to us before 13 December then you'll be in with a chance of winning a Commodore VIC-20 colour computer.

We have three to give away to the best programs that come in before that date.

We have a program to solve the puzzle which will be printed in our January issue. But for the very frustrated we will be showing a solved puzzle next month.

A panel of three judges will sift through the programs you send in and if yours is one of the best then a VIC-20 computer will be on its way to you.

Warning: Trying to do this puzzle without a computer using the old fashioned trial and error method could result in hours of frustration.

Make the most of your Sinclair ZX Computer...

Sinclair ZX software on cassette.

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The unprecedented popularity of Cassette 1-Games.

Computers has generated a large volume of programs written by users Sinclair has undertaken to publish the most elegant of these on pre-recorded cassettes. Each program is carefully vetted for interest and quality, and then

grouped with other programs to form a single-subject cassette. Each cassette costs £3.95 (including VAT and p&p) and come complete with full instructions. Although primarily designed

for the Sinclair ZX81, many of the cassettes are suitable for running on a Sinclair ZX80—if fitted with replacement 8K BASIC ROM. Some of the more elaborate

Some of the more elaborate programs can be run only on a Sinclair ZX Personal Computer augmented by a 16K-byte add-or RAM pack.

This RAM pack and the replacement ROM are described below. And the description of eac cassette makes it clear what hardware in security.

SK BASIC BOM

The 8K BASIC ROM used in the ZX81 is available to ZX80 owners as a drop-in replacement chip. With the exception of animated graphics, all the advanced features of the ZX81 are now available on a ZX80-including the ability to run

new keyboard template, which can be overlaid on the existing teyboard in minutes, and a new

16K-BYTE RAM pack

The 16K-byte RAM pack provides 16-times more memory in one complete module. Compatible with the ZX81 and the ZX80, it can be used

for program storage or as a database
The RAM pack simply plugs
into the existing expansion port of
the rear of a Sinclair ZX Personal
Computer.



Cassette 1 - Games For ZX81 (and ZX80 with 8K

(ASIC ROM)
ORBIT – your space craft's nission is to pick up a very valua

argo that's in orbit around a star SNIPER – you're surrounded by 40 of the enemy. How quickly can you spot and shoot them wh

METEORS – your starship is cruising through space when you meet a meteor storm. How long can you dodge the deadly danger?

LIFE – J.H. Conway's 'tsame of Life' has a chieved tremendous popularity in the computing world Study the life, death and evolution

patterns of cells.

WOLFPACK – your naval
destroyer is on a submarine hunt.
The depth charges are armed, but
must be fired with precision.

must be fired with precision.
GOLF—what's your handicap?
It's a tricky course but you control
the strength of your shots.

Cassette 2-Junior Education: 7-11-year-olds For ZX81 with 16K RAM pack CRASH-simple addition-with

if you get it wrong.

MULTIPLY -long multiplication with five levels of difficulty. If the answer's wrong-

TRAIN - multiplication tests against the computer. The winner's train reaches the station first.

explained at three levels of difficulty. A ten-question test completes the program.

ADDSUB – addition and subtraction with three levels of difficulty. Again, wrong answers are followed by an explanation. DIVISION – with five levels of difficulty. Mistakes are explained

graphically, and a running score is displayed. SPELLING-up to 500 words over five levels of difficulty. You

can even change the words yourself. Cassette 3-Business and Household

For ZX81 (and ZX80 with 8K BASIC ROM) with 16K RAM pack TELEPHONE – set up your own computerised telephone directory and address book. Changes, additions and deletions of up to

NOTE PAD - a powerful, easyo-run system for storing and



retrieving everyday information Use it as a diary, a catalogue, a reminder system, or a directory.

BANK ACCOUNT – a sophisticated financial recording system with comprehensive documentation. Use it at home to keep track of where the money goes, and at work for expenses, departmental budgets, etc.

Cassette 4-Games

BASIC ROM) and 16K RAM pack
LUNAR LANDING. bring the
lunar module down from orbit to a
soft landing. You control attitude
and orbital direction—but watch the
fuel gauge! The screen displays your
flight stans-digitally and graphically.
TWENTYONE—a dice version
of Blackiack.

COMBAT – you're on a suicide space mission. You have only 12 missiles but the aliens have unlimited strength. Can you take 12 of them with you? SUBSTRIKE – on patrol, your

SUBSTRIKE—on patrol, your frigate detects a pack of 10 enemy subs. Can you depth-charge them before they torpedo you?

CODEBREAKER—the computer thinks of a 4-digit number

which you have to guess in up to 10 tries. The logical approach is best! MAYDAY—in answer to a distrescall, you've narrowed down the search area to 343 cubic kilometer of deep space. Can you find the astronaut before his life-support system fails in 10 hours time?

Cassette 5 – Junior Education: 9-11-year-olds For ZX81 (and ZX80 with 8K

MATHS—tests arithmetic with three levels of difficulty, and gives your score out of 10. BALANCE—tests understanding

of levers/fulcrum theory with a series of graphic examples. VOLUMES—'yes' or 'no'

series of cube volume calculations.

AVERAGES – what's the average height of your class? The average shoe size of your family? The average pocket money of your friends? The computer plots a bar chart, and

distinguishes MEAN from MEDIAI BASES – convert from decimal (base 10) to other bases of your choice in the range 2 to 9.

choice in the range 2 to 9.

TEMP-Volumes, temperatuand their combinations.

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	22	Cassette 2-Junior Education	€3.95	
	23	Cassette 3-Business and Household	₹3.95	
	24	Cassette 4-Games	₹3.95	
	25	Cassette 5-Junior Education	£3.95	
	17	*8K BASIC ROM for ZX80	£19.95	
	18	*16K RAM pack for ZX81 and ZX80	£49.95	
		*Post and packing (if applicable)	£2.95	
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*Please add £2.95 to total order value only if ordering ROM and/or RA Lenclone a cheque/PO to Sinclair Research Ltd for £.

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CVGII

Circle No. 120

Sinclair ZX81 Personal Comp the heart of a system that grows with you.

1980 saw a genuine breakthrough the Sinclair ZX80, world's first complete personal computer for under £100. Not surprisingly, over 50,000 were sold.

In March 1981, the Sinclair lead increased dramatically. For just £69.95 the Sinclair ZN81 offers even more advanced facilities at an even lower price. Initially, even we were surprised by the demand – over 50,000 in the first 3 months!

Today, the Sinclair ZXB1 is the heart of a computer system. You can add 16-times more memory with the ZX RAM pack. The ZX Printer offers an unbeatable combination of performance and price. And the ZX Software library is growing every day

Lower price: higher capability
With the ZX81, it's still very simple to
teach yourself computing, but the
ZX81 packs even greater working
capability than the ZX80.

It uses the same micro-processor, but incorporates a new, more powerful 8K BASIC ROM – the 'trained intelligence' of the computer. This chip works in decimals, handles logs and trig, allows you to plot graphs, and builds up animated displays.

And the ZX81 incorporates other operation refinements – the facility to load and save named programs on cassette, for example, and to drive the new ZX Printer.



New BASIC manual
ery ZX81 comes with a comprehensive, specially-wri

Kit: £49.95

Higher specification, lower price how's it done?

Quite simply, by design. The ZX80 reduced the chips in a working computer from 40 or so, to 21. The ZX81 reduces the 21 to 4!

ZX81 reduces the 21 to 4!

The secret lies in a totally new master chip. Designed by Sinclair and custom-built in Britain, this unique chip replaces 18 chips from

New, improved specification

780A micro-processor – new

the 7X80!

faster version of the famous Z80 chip, widely recognised as the best ever made.

Unique 'one-touch' key word

entry: the ZX81 eliminates a great deal of tiresome typing. Key words (RUN, LIST, PRINT, etc.) have their own single-key entry. Unique syntax-check and report

codes identify programming errors immediately.

• Full range of mathematical and

scientific functions accurate to eight decimal places.

Graph-drawing and animated-

display facilities.

Multi-dimensional string and numerical arrays.

Up to 26 FOR/NEXT loops.
 Randomise function – useful for games as well as serious applications.

Cassette LOAD and SAVE with named programs.
 1K-byte RAM expandable to 16K

bytes with Sinclair RAM pack.

• Able to drive the new Sinclair

 Advanced 4-chip design: microprocessor, ROM, RAM, plus master chip – unique, custom-built chip replacing 18 ZX80 chips.

Built: £69.95

Kit or built – it's up to you! You'll be surprised how easy the

ZXB1 kit is to build: just four chips to assemble (plus, of course the other discrete components) – a few hours' work with a fine-tipped soldering iron. And you may already have a suitable mains adaptor – 600 mA at 9 V DC nominal unregulated (supplied with built version).

Kit and built versions come complete with all leads to connect to your TV (colour or black and white) and cassette recorder.





16K-byte RAM pack for massive add-on memory.

Designed as a complete module to fit your Sinclair ZX80 or ZX81, the RAM pack simply plugs into the existing expansion port at the rear of the computer to multiply your data/program storage by 16! Use it for long and complex

programs or as a personal database Yet it costs as little as half the price of competitive additional memory.

With the RAM pack, you can also run some of the more sophisticated ZX Software - the Business & Household management systems for example.

بنصاصان Tel: (0276) 66104 & 21282.

Designed exclusively for use with the 7X81 (and 7X80 with 8K BASIC ROM), the printer offers full alphanumerics and highly sophisticated

A special feature is COPY, which prints out exactly what is on the whole TV screen without the need for further intructions

How to order your ZX81

BY PHONE - Access. Barclaycard or Trustcard holders can call 24 hours a day, every day BY FREEPOST - use the no-stampneeded coupon below. You can pay

To the state of th

or sending to a friend.

Printing speed is 50 characters per second, with 32 characters per line and 9 lines per vertical inch

The ZX Printer connects to the rear of your computer - using a stackable connector so you can plug in a RAM pack as well. A roll of paper (65 ft long x 4 in wide) is supplied, along

by cheque, postal order, Access, Barclaycard or Trustcard EITHER WAY - please allow up to 28 days for delivery. And there's a 14-day money-back option. We want you to be satisfied beyond doubt -

and we have no doubt that you will be

Oty	Item	Code	Item price	Total
	Sinclair ZX81 Personal Computer kit(s). Price includes ZX81 BASIC manual, excludes mains adaptor.	12	49.95	
	Ready-assembled Sinclair ZX81 Personal Computer(s). Price includes ZX81 BASIC manual and mains adaptor.	11	69.95	
	Mains Adaptor(s) (600 mA at 9 V DC nominal unregulated).	10	8.95	
	16K-BYTE RAM pack.	18	49.95	
	Sinclair ZX Printer.	27	49.95	
	8K BASIC ROM to fit ZX80.	17	19.95	
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BATTLE OF THE Ream back to prehistoric times

fought bloody battles to the

That is the setting for one of the games available for Tandy's latest machine, the TRS-80 Colour computer. Called Dinowars the 3D game is for two players, or one player against the compu-

When you switch on the computer - Tandy promises it will be available this month - a pair of dinosaurs flash up on the screen. One is red, the other blue. Each of the beasts is controlled by a joystick and can be moved backwards, forwards, to the left and right. The picture on the screen runs around so that the monsters can walk off the screen at one edge and reappear on the other side

With tails swishing the two when the land was covered in dinosaurs leap ferociously into swamps and terrifying dinosaurs action when the button on the joysticks is pressed. Then the fight to the death begins complete with gruesome sound effects.

The players have to mangeuvre their monsters into a ood position to kill each other. To do that they have to plant a lethal bite on the back of the neck. If the dinosaur dies from his wounds he literally drops dead in front of your eyes. If a

monster dies the player in control of him loses 10 points. One unusual feature is that the dinosaurs can be killed when they are off the screen. As you can't actually see what they're doing it's more a matter of luck than judgement. It costs £22.95 and is available from your local

Tandy store.

TOWERING INFFRNO They say there is no smoke with-

out fire and in Towering Inferno it is truer than ever Recently produced for the

Sharn M7.80K by Sharnsoft the game is definitely not for the squeamish. The object is to find your way out of a multi-storey building which is on its way to being gutted by fire. The only way out is to go

down to the bottom floor — you are stuck on the 10th storey - or to go up to the roof of the building. There is no time to panic on

your escape. As you make your way from one floor entrance across the room to the exit you have to judge the quickest way to avoid the fast-spreading flames. You control a man with the cursor keys and have an aerial view of each floor. If you are not careful where

you tread you might find yourself overcome temporarily by smoke

EAT OR **BE EATEN**

An addictive new Pet game will keen you glued to screens trying to avoid fast-moving monsters. Avid fans of the Mazeman or Puckman arcade game, who also

happen to own a Pet, will be eager to try this rather different version in their homes. Called Super Glooper, the

object is to gobble-up as many monsters as you can. A difficult inh because they move very quickly and can turn on a heel suddenly while you are in hot pursuit of them and without hesitation will eat you up.

The hectic chase takes place in a maze with points being scored for swallowing-up dots along the path and for monsters



man under your control disappears from the screen for a sec

If you manage to reach the rnof it is not certain that you will survive the ordeal. With luck a helicopter will swoop down, dropping a rope ladder to whisk

If you reach the bottom and emerge safely, an ambulance will drive to the building and take you away to recouperate in hospital. It costs £5.85.

which you catch up with and manage to devour

The Gloopers travel that much faster than you can go and the game has been written in machine code to give it extra speed It is available from Pet software supplier Supersoft



PFRII ON THE SEARED

Not for the claustrophobic Sea Wolf recreates the perils of submarine warfare complete with mines tumbling off the decks of enemy destroyers.

At war with an enemy fleet the commander of the submarine must shoot down ships sailing above him on three different levels Coloured number red and white the ships are worth varying number of points when they are successfully destroyed. Each ship moves at a different

pace, the fastest ones sailing at the top of the screen farthest away from the submarine making it more difficult to get a direct hit. Use a joystick to move the submarine and the button to fire

an unlimited supply of torpedoes. There are two levels of play: for beginners and expert shoot-

SEAWOLF



ers. The submarine commander is firing against the clock which ticks away from 60 seconds down A minute has never gone so quickly. Rut the commander has to

keep a wary eye out for destrover mines released by enemy The console looks like a poc-

blocking the path of torpedoes. If a torpedo hits one by mistake it's a wasted shot. Don't worry too much about the mines because they cannot sink down to your level in the sea.

The shins sailing at the lowest

level (coloured white) are the slowest moving and the easiest target. They are only worth five points at skill level one or 10 points at level two.

Next up are smaller ships which travel more quickly. The red ships are worth more points. 15 at level one and 25 at level

And ruling the waves at the top of the screen are the smallest and factors chine in the fleet They zip along, barely giving the submarine commander time to take aim let alone fire. These purple coloured ships score 50 (level one) and 60 (level two). They are the ones to go for to hoost your score. Once the score reaches a magic 800 the time limit is extended giving you scope to shoot down more ships.

The extras needed are a invstick, the game is supplied by Adda Computer's VIC Centre The cassette with two other games on it costs £14.95. **DEATH AMONG**

CHESS ON THE CHEAP

Computerised chess games have now reached Christmas stocking prices with the launch of Acetronic's Electronic Chess

Retailing at only £24.95, it compares very favourably with other chess games on the market which can set you back anything up to £500. And it includes a lot of the standard features you would expect

ket calculator with a liquid crystal display and keys representing the pieces and numbered squares of the board But you will need to provide

your own hoard and pieces. Only two levels of play but the Flectronic Chess owner can choose to play black or white, or _ if he wishes _ watch an

instructive game with the computer playing against itself. It will tell the player if he made an illegal move and can delete the move he made with a cancel

key. It also allows the player to verify the positions at any stage during the game and program in opening variations using a special key Other features include setting

up and removing individual pieces and placing a game position from which the computer will continue to play.

This offers a good game to the keen chess youngster who is short of an opponent and will will also fit into most family

FINGER ON

THE STARS An action-packed space game which looks set to be a scorching

success is Starmines It first reached Apple screens

in the States and has just been released in the U.K. Take command of a starship fighter on a mission in the galaxy to defend your own civilisation from the threat of invasion.

You control the starship flying through hyperspace dodging attacking missiles, meteorites and small spaceships all out to get you. The action is fast and you barely have time to press the fire button to exterminate an alien ship before a shower of rocks falls at the speed of light

To hit the objects you must line them up in your sights and

press the fire button. Raiders and Space Battle vein,





the popular arcade game Missile Command The player has to protect cities from an onslaught of bal-

listic missiles, alien space ships and other extra-terrestrial beings. Saving the cities from obliteration is in your hands you control the ground base where anti-ballistic missiles are launched.

Polaris is designed to run on the TRS-80 models but though the game's concept is exciting without the colour graphics available on arcade games and other microcomputers, it still loses a lot of its attraction. It is also expensive for a computer game at £27.95 so only keen fans of the original are likely to spend that amount of money on

GO FOR REAL GOLD

One computer game destined to follow the success of Kit Thomas' treasure book "Masquerade" is

"Masquerade" was the book which became a best-seller by offering clues to a £5,000 piece of iewellery in the shape of a hare. Since it first appeared many treasure hunters have due un various stately homes and searched numerous river heds in the mistaken belief that they have solved the clues and will find the treasure. Whether Mr Micro's VIC game

Goldrush will keep its players guessing for as long, we will have to wait and see - but there is no shortage of interested people waiting to try solving the

The prize for the winner is real gold nuggets provided by Mr.

The game is an Adventure type based on the 1849 Californian gold-rush. Participants start trekking across to California with a number of clues to be found on the way. Once there, you have to stake a claim and try to find the Golden Word

First person to get in touch with Mr Micro with the correct word wins the gold A review appears on page 88.

Coming soon for the justreleased Commodore VIC 20 is a variety of new games including versions of Puckman, the popular arcade game, Galaxians, Cosmic Jailbreak. Space Invaders and Moon Lander. These were scheduled for release in October at the earliest and will be covered in more detail in future





owners are invited to dice with Death as opposed to Life in a new game from Leisure Genius This new strategic game is

based loosely around the computer classic. Life, and involves building-up cells until you can dominate your opponents by destroying them through disruntion of their cell structures.

play with and from which evolve your own universe. Each player starts with a stock

of cells which they can choose before the name kicks off First you have to decide how many calle each player is allowed and then select the structures you want to play with

Also take into consideration how quickly you want the cells to

IS DEATH There are 10 cell structures to

THE OPPOSITE OF LIFE

generate and the number of generations carried-out during the multiplying period. It is for the players to set the name rules Another option available is

assessment of the nieces nosi-

the cells into any position on the screen, the idea being to get them in the proper place to see them regenerating. It demands absolute concentration to keep track of your cells and those of your opponent. The

The rules of the game are complicated and therefore take some getting used to but once you have decided exactly what to do and the conditions necessary

for cells to regenerate the game,

Conditions for regeneration

must be three cells next to an

empty space - in that space a

new cell will non up so you can

literally see your empire grow. If

a cell has two or three cells

positioned next to it, that cell is

safe and will survive but if it has

fewer than two or more than

three the cell cannot cone and

the screen, each placing cells in

desired positions. You can move

The two players fight it out on

will shrivel and die.

it is difficult to stop playing

generation cycle begins when both of you have finished placing your cell structures. Once you have learnt how to play Death you can vary the

levels and intensity of the name with the selection controls. Made by the London-based firm Leisure Genius, you get your money's worth for £15.

TWO-IN-ONE SPACE TRIAL

Two popular arcade games, Missile Command and Asteroids have been combined to transfer

to the Pet screen Called Meteorites, the aim of the game is to protect seven

bases from a swarm of meteorites descending from the The only way to survive is to blast the rock showers with your

laser oun, but you will find that often it serves only to shatter the meteorites into even smaller - yet just as deadly - frag ments

Altogether you have to fightoff six waves of meteorite storms, scoring points on the way for each hit. Other hazards to avoid are alien ships which swoop down intermittently to fire at the bases under your protection. Shoot down one of those

and you score bonus points. Meteorites is from the Harrow-based firm Supersoft who also supplied Hitchhikers Guide to the Galaxy addicts two months ago by producing a Pet version of the Douglas Adams honk and TV series.

FXFCIITIVE CHESS

for the Acorn Atom. A new chess game is out for the cally suggest the best move the In this game introduced by dedicated enthusiast at the top player can make by doing a quick Leeds software supplier Program and of the Chess Challenner

Power, the only protection is a metal detector to pick out the This version's attributes lie in its design and the capabilities

and scope for play. The minefield spreads across There are 10 levels of difficulty the screen with the one safe patch being your home square on which the player selects going right from beginner to expert. So the far side of the field. the 'Decorator Challenger' can be On the same tane, which costs used by inexperienced chess PS 95 are two other Atom games.

Snake and Awari The first is a players as a learning tool but still give a good game to club players. variation on the barriers type game. Two serpents grow in A book comes with the game which lists 40 different chess length and the object is either to openings, with approximately cut off the opposing snake, or make his snake cross over itself. In the Atom version, the sernent is trapped in a square box

1200 book opening moves programmed in. The Decorator plays either black or white and is canable of repeating all the positions which has electrified walls. Numbers flash in the box and the of the nieces left on the board at any, stage of the game at the snake has to onbble-up as many as possible. If he touches the press of a hutton in case the player's memory fails him. walls, or doubles back and touches itself, 50,000 volts are If the player gets stuck the friendly Decorator will automatishot through his body. Like most

This deluxe chess game is a full size board concealing the electronics and microprocessor but with an attractive playing

surface. It is made of hardwood. stained to obtain the light and dark colours. The pieces top are made of the same wood and can be stored in containers next to the hoard. The calculator styled keyboard console is also on the same section

The whole unit stands in a carved frame with four small

But it is expensive, selling at the moment for the grand price of £395.95. Included in that price is a booklet of opening moves. It is marketed in the UK by Computer Games and is definitely the executive computer chess set.



Tread warily to save your skin when you are playing Minefield. one of the latest games available

Fach player is given six pits on which they place his pebbles. Then in turn the nebbles are moved according to certain rules. The game finishes when one player has put his stones on the opponent's territory.

of these games it proves a good

computerised version of an ancient African pebble game,

Awari. A strategy game for thin-

kers, the object is to win as many

pebbles from your opponent as

possible to dominate his terri-

test of your reactions. The third game is another

OF ALL the innumerable games appearing on computers, large and small. Chess is one of the few which has a genuine existence in the same form outside the computer environment. The history of the ancient game covers many hundreds of years and. indeed, among the first books ever printed in English - by

Caxton - was one on Chess. The success of computers in making in-roads into the complex field of intellectual endeavour has been remarkable, with the best programs now performing at a level to which few regular club or county-level players could ever aspire and beginning to cause problems even for experienced masters.

Exactly what has been achieved, and what has not, will be one of the perennial topics of this series. In each issue I hope to include a combination of historical and background material, together with up-to-date reports on tournaments - particularly microcomputer tournaments - and product reports.

The idea of a chess-playing machine has a long history. pre-dating that of the electronic computer by many years. An automatic chess-player built in 1769 by the Hungarian. Wolf-

The second world microcomputer championship was held in West Germany in Sentember, under the auspices of both the International Computer Chess Association (ICCA) and the International Chess Federation (FIDE).

Here is the decisive game between the first and second prize winners from the first world microcomputer championship, played in London last September.

1. P-K4, P-K3;	11. QXQch, RXQ;
2. P-Q4, P-Q4;	12. B-Q3, B-Q2;
3. N-QB3, B-N5;	13. O-O, QR-Q1;
4. P-K5, N-QB3;	14. QR-N1, B-B1;
5. Q-N4, P-KN3;	15. B-KR6, R(B1)-
6. N-B3, P-B4;	16. KR-K1, N-KN1
7. Q-N5, BXNch;	17. N-N5ch, K-K2
8. PXB, KN-K2;	18. B-N7, P-KR3;
9. Q-R6, K-B2;	19. N-R7, K-B2;
10. B-KN5, Q-B1;	20. B-B6, NXB;

13. O-O. OR-O1 14. QR-N1, B-B1; 16. KR-K1. N-KN1: 17. N-N5ch, K-K2: 18. B-N7. P-KR3:

By Max B

gang Von Kempelen. demonstrated to the court of Empress Maria Theresa of Austria two centuries ago

The automaton chess-player was built in wood in the form of the upper portion of the torso of a man, approximately life-size and dressed in the clothing of a Turk, complete with turban and cloak. The figure was seated at a chest on which a chess-board was placed. Before each game the doors of the chest were opened to reveal a complex collection of gears, pulleys and lev-

During the game the opponent's moves were made on the board in the usual way, with the Turk's moves being played by itself with its left hand.

Needless to say. Von Kempelen's Turk was no more than an elaborate hoax, with a man hidden inside the chest, detecting the opponent's moves by means of magnets and working the Turk's arm by means of a pantograph, while being confined to a small area lit by a candle.

Even knowing of the hoax, the Turk remains an extremely impressive invention. Not only did the public demonstration appear to show that the whole of

21 NXN R.K2-33. R-QN1, P-B3; 22. P-KR4. P-N3: 34. PXP. R-Q7d: 23. P-R5. P-KN4: 35. K-N1. B-R3: 24. P-N3. P-R3: 36. N-Q7. RXBP 25. P-B3. N-R4: 37. PK6ch. K-K1: 38. N-B6ch, K-B1; 26. P-N4, P-N4; 27. K-N2, N-B5 39. N-05. R-0R2: 28. BXN. OPXB: 40. PK7ch. K-K1: 29 PXP PXP: 41. N-B6ch, K-B2; 30. P-Q5, B-N2; 42. P-K8=Qch, K-N2; 31. R (N1)-Q1, B-B1; 43. Q-N6ch, K-B1; 32. K-B2, P-R4; 44. RK8 mate. · ·

7 主 医密 0 1 E 1 1 211 1 1 Position after Black's 29th mov the chest was either empty or occupied by machinery, but the engineering required to make the hoax work was highly complex, so much so that even those scientists convinced that there must be a hoay found it almost impossible to explain how it was achieved.

The Turk's secret survived intact from 1769 to 1834. Twenty years later the ingenious creation was destroyed by fire, its final resting place being the Chinese Museum in Philadelphig. The story of the Turk is told in fascinating detail in The Great Chess Automaton by Charles Michael Carroll.



As an incentive to the ambitious chess programmer, Fredkin Foundation of Cambridge. Massachusetts has recently established a prize of \$100,000 for the first computer program to beat the world

human champion in a match. Although the goal still seems well out of reach, the improvements made in the last few years are most impressive. The purpose-built chess machine Belle - much larger than Sensory Voice Challenger but probably still just qualifying as a microcomputer - won the world computer chess championship convincingly in Linz last year against computers of all sizes and has since attained a performance rating around 2,300 on the U.S. Chess Federation scale, a very high master rating.

ARCADE ACTION

YOUR NAME IN LIGHTS

How do you go about putting your name up in lights on the high score chart of your favourite machine?

Short of carrying pockets full of 10n nieces down to your local

The "Ghoste" that inhabit the Mazeman type of arcade machine you are invited to call them, most

The machine itself varies in title from Pacman Puckman or Picman to the more descriptive Mazeman, But whatever the name of the machine you have help you achieve a high score remain the same. Here are some hints to help you increase your fruit yield at the bottom of the screen

Firstly it is important to develop an opening strategy for the early "walls" (each cleared screen generates a new "wall"). Study the early movements of the ghosts and you will see that

FLAW SHOW

Two interesting little programming flaws can be found in the Mazeman game. If you persuade your friends to devote the money for a little experimentation you may be able to re-create them on

It is possible to send an errant pair of eyes flitting around the area of screen just above the ghosts' base.

This can be achieved, sometimes, if you catch a ghost just as he emerges from his base and eat him. This must be attempted early in a wall, by eating a flashing dot and then speeding to the exit of the ghosts' base, to con-

It is also possible to turn the ghosts bright orange. This often occurs when you eat a ghost just as he turns from a flashing blue consumable back to his normal colour. Of course, trying this automatically means you lost a life

pub or arcade, is there any faster way to master the new video

game which has you hooked? We think so and every month in our Tips section we will be giving advice that will keep Computer & Video Games readers ahead of the pack on the oppular arcade games of the

The tips will come from experts who have already worked their way inside the head of the game's programmer and game of Asteroids De Luxe

discovered ways of prolonging each 10o's worth of life from a particular machine.

No game is ever really mastered but this column will give practical ideas to help you survive as long as possible against the indefatigable creatures that inhabit every video games cahinet

In this issue we look at the Mazeman - also known as Pacman and Puckman — type of game. While next month we will offer some hints on the difficult

going to print machine "slang". Any terms or expressions you

In this same column we are and your friends use to describe certain events or creations in a game. One example is how quickly Space Invaders became known as "Green Meanies" Also on the irreverent side, let

us know about any programming "huns" on a machine. These are areas on a game where the proprammers have not foreseen that a certain sequence of actions will produce a peculiar response on the screen. Tell us about these strange happenings and how to recreate them.

this tactic

Now let me give you some thing to aim for. After a run of various fruits - worth more for each wall - a creature I can only describe as a "Galaxian" appears on the screen. This wall, when cleared, rewards you with an intriquing little display involving the red phost.

these only vary if you go very

you clear of them for longest and in close pursuit, to a flashing dot

Good tips for this are to clear the hottom row as this is the easiest place to get trapped. You will only manage to do this in the first two walls. Then change your route for the third wall but still make sure you clear at least half of that bottom line The chosts speed up again for the fifth wall so a new opening strategy will he needed for this one. Good opening gambits leave both the flashing dots at the bottom of the screen to last - insurance for work wonders. the time you get caught with a

When you come around to those final few dots, be patient. the tunnel, through which you

close to them. Experiment to find Mazeman ghosts. If you can lead a path which will each time keep three through here it should provide enough time to tidy up the

Another important area is the network directly above the ghosts' base. With a cool head you can manoeuvre this part of the maze with ghosts in close attendance and still stay out of danger - there is also a possibil-

ity of swooping down to swallow a fruit when one appears. When you do find yourself trapped in a corner, (at the top phosts travel faster than you can)

If the position looks really

honeless a vinorous shake of the lever can confuse the ghosts and send them off in different directions. Remove drinks from on top of the machine when employing

STREET TALK

A collection of machine slang or strange expressions overheard while watching people play the Mazeman variety of game. Complete with a likely interpretation

of the meaning. · A monster munch - eating all four ghosts to score a 1,600 point

bonus. · An expensive fruit - caught by a ghost after being tempted to

eat a fruit. · Get them in the nest - trying to eat the ghosts while they are still inside their base (a rather

pointless exercise as you can't get in) · Fangs in the backside job -

escaping after a ghost seemed certain to catch you

ness of your local arcade owner you will find yourself with 2-5 lives and one of four levels of

SEA-SPACE MISSION

Cosmic Avenger sends you off on a hazardous mission, through space and along undersea passume the ghost as he bounces sages to destroy the enemy's Among the dangers you will

have to overcome are tanks, U.F.O.s mines, submarines, missile stations and the task is made ever more difficult as you

approach the secret base. The game is along the lines of Defender with your craft starting along the route you have to take.

off on the wide plains, facing anti-aircraft fire from ouns and The enemy's chase missiles

are fired from impressive installain the underwater caverns from rocky niches above you

Their missiles will chase your craft and their hit rate is high so beware. U.F.O.s are another menace of the air but are equipned with radar to help you see them approaching.

In the sea, the enemy's submarine missiles and his own subs are just some of the problems, as mines and depth bombs feature



JOIN THE SPACE PILOT FLITE

Mastering the Omega Race will number you among the known galaxies' elite space fighter

For this training method was invented originally by the Omega Star System to make its pilots Sitting in the cockpit of your craft the city of Komar nanoramically spread below you.

android forces and the mines they have planted in your path. The player uses a guidance

control knob to steer his craft and a thrust button for force to take his craft into the energy field. As the alien droid fleet and its mines fill your screen, pressing the fire button sends out deadly laser rays to destroy the enemy tarnets

Photon and Vapor mines are worth 350 and 500 noints respectively. Droid Ships bring you 1,000 points and the Command Ships 1.500.

Most dangerous is the enemy Death Ship which appears at random and has far greater speed and manoeuvrability than is to bump and demolish the

Ronus Omega Fighters are awarded for high scores and top scores are kent on the screen for all to challenge. The backdrop of this game, which is distributed by Bally U.K., is impressive but the ship and mine graphics are disappointing by present stan-

RETURN OF

THE MEKON

Remember the evil Mekon? A

little green creature with a large

head who hovered on a saucer

and was to Dan Dare what the

Daleks are to Doctor Who.

Monsters and magicians bring fantasy to the world of arcade games in the highly original Wizard of Wor

It also brings back the pingpong video games idea of letting two players loose on the controls simultaneously, so giving the feeling that this game is man against man, rather than man against machine

It does not dictate that you have to fight one another and will allow teamwork against the strange monsters which inhabit the Dungeons of Wor.

Players control a separate squadron of "worriors" - blue or vellow-clad humanoids dressed in snace suits and armed with "unified field-disturbance rifles"

They venture out into the dungeons, a maze of passages of random design with escape doors at either end, with a view to destroying the monsters which inhabit the labvrinths. There are four kinds of mons

ter plus the Wizard himself. The blue Burwors are worth 100 points each and six of them inhabit the first dungeon. When all six are shot, yellow Garwors - 200 points and often invisible

- and speedy red Thorwors -500 points - join the battle When all are killed the next maze appears containing more

At the end of the game he will give his honest, if patronising, opinion on what kind of opposition you provided for him to test

The game is similar to a colourful asteroids except that the opposition is provided by the one-eved monstrosity's battle

fleet These is a variety of whirling dervishes which are harmless until they have joined together to form a larger space craft and will then either ram your own craft or fire an accurate orange bomb

towards you. When you have demolished his first collection of unlikelylooking space ships with your



THE FANTASY GENERATION

worriors. The opposing worriors speed and hurling lightning bolts are also allowed to shoot one at the players. another's men for 1,000 points. This time a Worluk, the

VIZAR

Wizard's favourite, flies through the dungeon when the last Thorwor is shot. If either player

can shoot this creature before he escapes it means double points on the next dungeon. That may prompt the Wizard to

own rather ordinary craft, this video Mekon expresses his surassures you that his next fleet tasy to arcade games. will finish the job.

One novel feature of the game is that you are invited to dock with a new spacecraft which will help you tackle the next battle. You dock with the craft you think best-suited to the next con-

flict Plenty of scope for tactics in this game so long as you can live with being described as a mediocre or, more commonly,

adequate, opponent, This Sega game is distributed over here by Alca Electronics of Manchester.

monsters to shoot or eat the angear, teleporting at magical

Throughout the game the Wizard talks to the players over the sounds of battle and a haunting melody which adds to the dungeon mond

A radar screen enables the player to keep a check on invisible monsters and this becomes more critical as the dungeons become more spacious.

A Midway game, distributed here by Bally U.K., Wizard of Wor prise at your survival and has brought a new world of fan-



Well, a similarly sinister creature - albeit with only one eye - turns up in the new arcade game of Space Fury to insult your playing ability, boast of the superiority of his battle forces and generally give the player a difficult time.

OTHELLO

LET us start by clearing-up the terminology. Reversi is better known these days as Othello but that is a recent name for a game the programming of Othello in Reversi for at least 100 years.

I hope to give some guidelines to the totals of the game and then show how a relatively simple-minded Basic program can play a reasonable game. I believe that it is possible to write an unbeatchie Other degree of larger and the substitution of th

reasonable thinking time. If one rates games by the ratio of the subtlety of their strategy to the simplicity of their rules. Othello rates very high indeed. Unlike most games which evolve slowly from move to move, the position of an Othello game can change dramatically with a single move.

Indeed, a good computer program can beat even expert human opponents regularly, simply by being better-equipped to keep track of a succession of complex board positions.

A beginner, and a very simple computer program, might pile by always looking for the move which turns over the most opposing pieces. That strategy will lose to any player with a little experience because the Othello player soon learns that what matters in the early stages of the game is not how many pieces one has but where they are situcted.

It is not until the last dozen or so moves that sheer numbers of pieces are important. What matters is how useful a piece is as a back-stop to help the capture of other pieces and how vulnerable it is to being captured.

That means that the board corners are very important, for a corner piece can never be captured. Positions on the edge of the board are also useful, since they can be captured only by other edge moves. A great deal

By Tom Napier

one of one's own.

The intervening opposing pieces are then turned over to exhibit one's own colour. If more than one line of pieces meet these conditions at a single move then all trapped pieces are turned over. If at any stage a player cannot make a legal move be passes and his opponent makes the next move.

If at any stage a player cannot make a legal move he passes and his opponent makes the next move. If neither can make a legal move, for example, when the board is full, the game is over and the winner is the player with the most pieces of his colour visible on the board.

	A	В	C	D	E	F	G	Н
1					1	-		
2			2					
3		3	0	0	4	- 5		
4		5		0		0		
5	6				0	0		
6		7		0	0	0		
7			8			-		
8		0	0	0		9		

of the strategy of Othello consists of forcing your opponent into a position where he is obliged to move adjacent to an edge or a corner and so allowing you to establish a piece in one of those strategic locations.

The correct positioning of pieces along an edge so as to minimise an opponent's gains requires considerable thought on the part of either a human or

electronic player but a reasonable game can be played by adopting some fairly simple totals. These totals can be translated into estimating a desirability figure for each square on the board — much the same as the points system in chess. The idea is then to move to achieve the highest sum of desirables of all the captured squares.

In essence, that is a one-move, look-ahead strategy. A more sophisticated program would look ahead for many more

The figure shows the position of an early stage of a typical game. White has played first and it is White's turn to play. He has a choice of nine legal moves, squares. Of those, I and 9 would capture one black piece, 2.3, 4.5 and 7 would capture three and 6 would not only capture three would not only capture three establish. White on, a previously unoncupied side.

Unfortunately, to play on 6 would be a fatal error, since Black could move immediately into the bottom left corner by capturing the three white pieces in the bottom row. That would establish him in a very advantageous position. Thus White's only safe move is in square 9, since that avoids the threat to his pieces on the bottom row.

If this threat had not been present the move at 6 would have been the best choice, whereas a move at 1, though on an edge square, would have been rather pointless since the piece placed at 1 would be re-captured immediately.

 Next month this page will deal with the problems of programming a microcomputer to play that increasingly popular came of Go.

The January issue will feature Bridge. Tom Napier will be back to give you further insights into the programming of Othello in our February issue.



If you want to feel at home in the world of computers, you'll want the best home computer in the world.

We live in the age of computers. Coming to terms with them and enjoying them is part of coming to terms with the twentieth century A few years ago, a computer would have

filled a fair-sized room. Now microtechnology has allowed Commodore to produce a home computer the VIC 20, that's no bigger than a typewriter yet performs miracles

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puter in the world will make to world of difference to you and your family.

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Please allow twenty-one days for delivery *Credit Card orde	es can be telephoned to (0536) 744015 anytime.
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Address:	
	Signature
COMPUTER SI	JPERMARKET
A Commodora Appointed VIC Dealer Please make remittant	res payable to Computer Supermarket Readers Account

The invaders runs on a Nascom 2. By Karl Parker and Torry Brown

20 PRINT TAB(20): PRINT"PLAU" 30 PRINT:PRINTTAB(15); :PRINT"SPACE INVADERS"

50 PRINTTOR(9)::PRINT"Score 1500 for ev 60 FOR V=2059+48 TO 2058+24 STEP -1

70 POKE V, 181: POKE V-1,32: POKE V+1,32 80 FOR D=1 TO 100:NEXT

98 NEXT U

FOR V=2058+24 TO 2058+48 STEP 1 92 POKE V.181:POKE V+1.84:POKE V-1.32

93 FOR D=1 TO 100:NEXT D 04 NEVT U

95 FOR V=2058+48 TO 2058+24 STEP -1

97 FOR D=1 TO 100:NEXT D

98 NEXT U 99 POKE 2058+24-32

100 PRINT"The object of the same is to destroy the"; 110 PRINT" advancing aleins before thay land on earth'

120 PRINT"You have 3 bases to start with and if you " 130 PRINT"manage to score 1500 points you will be "; 140 PRINT"awarded an extra base"

150 PRINT"The keys which move your base are the rig"; 160 PRINT"ht arrow to move your base right and the 1"; 170 PRINT"eft arrow to move your base left and the ";

180 PRINT"space bar to fire "

190 INPUT"PRESS ANY KEY TO CONTINUE ";NS 200 CLS

231 PRINT"LINESLINESLINESLINESLINESLINESLINES

240 PRINT "ANDFREFREFRET space ship scores random score"

251 PRINT"LINESLINESLINESLINESLINESLINESLINES"

260 PRINT"Top row of aliens score 50 Points"

LITHESE THESE 271 PRINT"LINESLINESLINESLINESLINESLINESLINES"

280 PRINT"Second row of aleins score 30 Points"

291 PRINT" I INESLINESLINESLINESLINESLINESLINES"

300 PRINT"Third row of aliens score

311 PRINT"LINESLINESLINESLINESLINESLINESLINES"

320 PRINT"Bottom row of aliens score 10 Points"

331 PRINT"LINESLINESLINESLINESLINESLINESLINES"

332 INPUT"PRESS ENTER TO CARRY ON" FC\$

340 CLS:CLEAR 10000:DIM A(2,1):SC=2058:HI=64

This is the game that needs no introduction. Can you stop the advance of the "green meanies" from outer space.

Sat in your battle tank, dodging deadly fire from the oncoming hordes of alien horrors. Darting out from behind your crumbling defence wall to zap one of their leaders before he gets too

close.

The object of the game is to destroy the advancing creatures

BATTLING

before they can land on the Earth. You have three bases to start with and if you manage to score 1,500 points you will be awarded an extra base.

The keys which move your bases are the right arrow and the left arrow and you fire by depressing the space bar.

This game by Terry Brown and Karl Parker, runs on a Nascom 2 and is a good likeness of the arcade game which gave its name to a whole genre of machines.

The fate of the Earth is in your

The large area of this listing which reads "LINES" is a Nas-Basic "Reserve Word". For each "Lines" replace it with a CHR\$ (152); graphics symbol.

THE INVADERS

350 WIDTH 255 3AB R4=".LLL!":D#="\LINESDEELINES/" 380 DIM I(6,3,2) 398 FOR A=3328 TO 3348 STEP 2:READ R 400 DOKE A.B: NEXT: DOKE 4100, 3328 418 BA\$=" LETREAD " 420 FOR A=1 TO 2:READ A\$(A+0):NEXT 430 FOR A=1 TO 2:READ A\$(A+1):NEXT 440 FOR A=0 TO 3:READ P(A):NEXT A 450 FOR A=0 TO 6:READ C(A):NEXT 460 BN=3:PT=0 *SPACE INVADERS* " 470 A\$="SCORE = 0 489 AS=AS+"BASES LEFT": FOR A=1 TO LEN(AS) 490 POKE 3018+A+ASC(MID\$(A\$+A+1)):NEXT A 500 FOR A=0 TO 2:POKE 30/4+A+170:NEXT 510 FOR A=1 TO 4:FOR B=13 TO 14 520 SCREEN A*11-5,B:PRINT B\$;:NEXT B,A 530 BP=1:GOSUB 640 540 GOSUB 550:GGT01780 550 ST=0:KB=0:FOR A=0 TO 6:FOR B=0 TO 3 548 T(A.R. 8) = TNT(RND(1) #2) 570 I(A,B,1)=A*6+4:I(A,B,2)=B*2+2+IH 580 NEXT B.A 590 FOR Y=0 TO 3:FOR X=0 TO 6 ANN GOSUB 1550 610 NEXT X,Y:X=0:Y=0:SH=0:KB=1 A29 ST=1:TH=TH+1:IF IH>4 THEN IH=4 630 KB=1:RETURN 640 SCREEN BP, 15:PRINT BAS; : RETURN 650 IF MP)1 THEN 670 660 SCREEN 1,1:PRINT "ANDFREFREFRE*" 670 HP=HP+1:SCREEN 1,1:PRINT CHR\$(22); 480 IF MP=49 THEN MS=0 698 RETURN 700 D=0:C=USR(0):IF C=0 THEN RETURN 730 IF C=32 AND SH=0 THEN SH=1:SX=RF+2:SP=13 740 IF BP+D(1 OR BP+D)42 THEN D=0 7,50 BP=BP+D 760 SCREEN BP . 15:PRINT BAS; 780 FOR C=0 TO 6:IF SH(C)=0 THEN 850

790 P=SC+SP(C)+HI*SH(C) 800 POKE P-HI*32



NASCOM

830 SH(C)=SH(C)+1:IF SH(C)(15 THEN 850 948 SH(C)=0:POKE P.32

858 NEXT C SAR FOR CHR TO ALIE SHEETIN THEN RETURN

878 NEXT C 980 BM=0:RETURN

890 IF SH(C)(14 THEN 970

900 SCREEN 1,15:PRINT CHR\$(27); 910 FOR T=1 TO 500:NEXT

929 RN=RN-1:POKE 3060+BN,32

938 SH(C)=8 940 IF BN=0 THEN 1000

950 SCREEN BP+15:PRINT BAS;

960 RETURN 970 FOR S=1 TO 5:IF PEEK(P)=C(S) THEN 998

980 NEXT:GOTO 840

998 PRKE P.C(S+1):SH(C)=0:GOTO 850 1000 FOR N=1 TO 16:PRINT:NEXT

1010 SCREEN 1,7:PRINT CHR#(27);

1020 PRINT "THIS IS THE END OF CIVILIZATION ": 1030 PRINT "AS WE KNOW IT!"

1040 GOTO 1510

1050 P=SC+SX+HI*SP 1868 IF PEEK(P)()32 THEN 1128

1070 IF PEEK(P+HI)=25 THEN POKE P+HI,32 1080 POKE P.25:SP=SP-1:IF SP=-1 THEN 1100

. 1898 RETURN

1100 POKE P.32:SH=0:RETURN

1110 BM=0:RETURN

1120 FOR A=0 TO 6:FOR B=0 TO 3 1130 IF I(A,B,0)(0 THEN 1290

1148 IF SP(I(A,B,2)-1 OR SP)I(A,B,2) THEN 1298 1150 IF SX(I(A,B,1) OR SX)I(A,B,1)+4 THEN 1290

1160 SCREEN I(A,B,1), I(A,B,2):PRINT D\$; 1170 SCREEN I(A,B,1), I(A,B,2)+1:PRINT"/"DEF"\"

1180 FOR D5=1TO 20:NEXT D5 1190 SCREEN I(A,B,1),I(A,B,2):PRINT "

1200 SCREEN I(A,B,1),I(A,B,2)+1:PRINT " 1210 T=P(B):PT=PT+T

1220 IF PT-T(1500 AND PT)=1500 THEN GOSUB 1500 1230 A\$=STR\$(PT):FOR C=1 TO LEN(A\$)

1248 POKE 3825+C+ASC(MID\$(A\$,C,1)):NEXT C

1250 I(A,B,0)=-1:SH=0:POKE P+HI,32

1269 FOR A=0 TO 6:FOR B=0 TO 3. 1270 IF I(A,B,0))=0 THEN RETURN

1280 NEXT B,A:SH=0:GOTO 550 1290 NEXT B.A

1300 IF PEEK(P)=184 THEN1320

1310 IF SP(13 THEN POKE P+HI,32:GOT01360 1320 POKE P.32:POKE P+HI.32

1330 FOR S=0T06:IF SX=SP(S) THEN1350

1340 NEXT S

1350 SH(S)=0:SH=0:RETURN 1360 IF SP)0 THEN SH=0:RETURN

1370 T=INT(RND(1)*501):PT=PT+T

1380 IF PT-T(1500 AND PT)=1500 THEN GOSUB 1500 1390 A\$=STR\$(PT):FOR C=1 TO LEN(A\$)

1400 POKE 3025+C, ASC(MIDs(As,C,1)):NEXT C 1410 SCREEN 1,1:PRINT CHR\$(27);

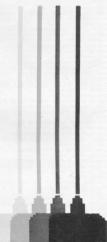
1420 MS=0:RETURN 1430 BB=INT(RND(1)*7)

1440 IF SH(BB))0 THEN RETURN 1450 FOR C=3 TO 0 STEP -1

34 COMPUTER & VIDEO GAMES

BATTLING





THE INVADERS



1449 TF T(RR.C.9))=0 THEN 1489 1470 NEXT C:RETURN 1480 SH(BB)=I(BB,C,2)+1:SP(BB)=I(BB,C,1)+2 1498 RM=1:RETURN 1500 POKE 3060+BN+170:BN=BN+1:RETURN 1518 SCREEN 10.9 1520 PRINT "TYPE 'ENTER' FOR ANOTHER GAME"

1530 A=USR(0):IF A()13 THEN 1530 1540 RUN

1550 IF ST=0 THEN 1730

1570 IF MS=1 THEN GOSUB 450 1580 IF MS=1 THEN GOSUB 650 1590 IF MS=1 THEN GOSUB 650 1600 IF KB=1 THEN GOSUB 700 1610 IF KB=1 THEN GOSUB 700 1620 IF KB=1 THEN GOSUB 700 1630 IF BM=1 THEN GOSUB 780 1640 IF BM=1 THEN GOSUB 780

1A50 IF BM=1 THEN GOSUB 780 1660 IF RND(1))0.4 THEN GOSUB 1430

1670 IF SH=0 THEN 1710 1680 FOR Z=1 TO 16:IF SH=0 THEN 1710

1690 GOSUB1050 1700 NEXT

1710 IF I(X.Y.O)(0 THEN RETURN

1720 IF MS=0 AND RND(1)>0.99 THEN MP=1:MS=1 1730 SCREEN I(X,Y,1),I(X,Y,2)

1740 PRINT A\$(1,1(X,Y,0)); 1750 SCREEN I(X,Y,1), I(X,Y,2)+1 1760 PRINT A\$(2,1(X,Y,0));

1770 RETURN 1780 F=0

1778 FOR Y=3 TO 8 STEP -1:FOR X=5 TO 0 STEP -1 1800 IF I(X,Y,0)(0 THEN 1840

1810 I(X,Y,0)=1-I(X,Y,0) 1820 I(X,Y,1)=I(X,Y,1)+M

1830 IF I(X,Y,1)=2 OR I(X,Y,1)=42 THEN F=1 1840 GOSUB 1550

1850 NEXT X.Y 1868 IF F=0 THEN 1780

1879 F=0 1880 FOR Y=3 TO 0 STEP -1:FOR X=6 TO 0 STEP -1 1890 IF I(X,Y,0)(0 THEN 1920

1900 I(X,Y,2)=I(X,Y,2)+1 1910 IF I(X,Y,2)=14 THEN F=1

1920 GOSUB 1550

1940 PRINT " 1950 NEXT X 1960 NEXT Y

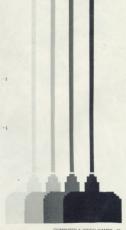
1979 IF F=1 THEN 1999

1990 M=-M:GOTO 1780

2000 DATA 289,1548,13833,8960,-1264

2020 DATA " LETJtREAD "," VAL by " 2838 DATA " LETTJREAD "," by VAL " 2040 DATA 50,30,15,10

2050 DATA 32,201,219,255,246,228,32



Try to outwit the computer opponent and make yours the last place on the board. A game of careful strategy.

Superview will run in Apple II systems with 16K. By Jerry Quancet

Supernim is a tectical game of supernim is a tectical game of

skill which goes one see Nimthe old treatment grane of Nimthe old treatment grane of nini deed condidate for comni ideal condidate for comni ideal condidate for computerised Nim has roots
guestised to the see the see the
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transfer of the see the see the
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removed adjacently, either horizontally or verticuly. The player with the least piece on the board with the least piece on the board wins the game decody proved of hospital computer game with the machine or computer game with the machine or computer game with the machine or sometime of the machine or the state of the machine or the state of the machine or the state of the state o



10 REM SUPER-NIM 20 REW A MULTI-DIMENSIONAL GAME

30 REM COPYRIGHT 1979 40 REM BY JERRY DUBNOFF FOR 1 = 770 TO 9061 READ J1 POKE 1, JiK = K + Ji NEXT i IF K (

> 8431 THEN STOP 1 REN DAT

DATA 173,48,192,136,208,5,206 ,1,3,240,9,202,208,245,174,0 ,3,76,2,3,96,169,0,73,0,141, 31,3,96,0,5,0,12,0,47,0,63,0

DATA 219, 219,27,56,46,62,9, 88,48,46,36,17,37,55,14,9,39 ,172,171,33,44,86,104,34,44, 54,1,88,48,14,36,53,40,54,0, 219,155,36,44,45,222,43,45,5

4,73,33,36,63,9,45,0 DATA 219,219,34,36,53,53,53,5 7,36,9,54,14,33,36,45,18,36, 45,54,6,0,34,36,0,219,19,36,

63,84,41,37,9,54,46,37,36,63 ,73,49,54,45,36,4,0 IF PEEK (175) + 256 1 PEEK

(176) > 8157 THEN 130 POKE 232,321 POKE 233,31 TEXT 1 HOME 1 HGR 1 ROT= 01 FOR 1 # 1 10 51 SCALE= 11 GOSUB 1

201 NEXT 1 FOR 1 = 0 TO 128 STEP 41 ROT= 11 BOSUB 1201 WEXT 1 FOR 1 = 1 TO 15: SCALE= 1: 605UB

110 FOR 1 = 15 TO 1 STEP - 11 SCALES 11 GOSUB 1201 NEXT 1 FOR 1 = 1 TO 81 SCALE= 11 BOSUB 1201 NEXT : HCOLOR= 6: DRAW 1 AT 140,901 FOR 1 = 1 TO 51 PRINT CHR\$ (7): NEXT : 80TO 140 120 XDRAM 1 AT 140,901 FOR J = 1

TO 51K = PEEK (- 16336)1 NEXT : IDRAM 1 AT 140,901 RETURN

130 TEXT : HOME : VTAB 12: HTAB 111 PRINT "sts SUPER-NIM sts

140 GOSUB 1170: TEXT : HOME : GOSUB

VTAB 12: HTAB 10: PRINT "MAN T INSTRUCTIONS? ": BOSUB 110 ON IF X = 217 THEN PRINT BE

160 TEXT : HOME : VTAB 10: HTAB 73 PRINT "I CAN PLAY AT DIFF ERENT LEVELS OF " HTAB 71 PRINT "SKILL. TELL ME IF YOU ARE!"

HTAB 7: PRINT "1) A BEGINNER "1 HTAB 71 PRINT "2) AN INTE RMEDIATE PLAYER"; HTAB 7: PRINT "3) AN ADVANCED PLAYER"; PRINT 1 HTAB 71 PRINT "ENTER 1, 2,

180 GET AN FOR DF = 1 TO 31 1F AS = STRS (DF) THEN PRINT B\$1 8010 200 190 WEXT 1 60TO 180

What would I do with a computer?



PROCESSES TO 3/3
REFERENCE DATE BALANCE BALANCE OF 11 6100
12000 41 6280100
12000 41 6286100
12000 51 6286100
ENG OF STATEMENT
PRESS ANY KEY TO CONTINUE

MR J JONES 67 HALL STREET NEWTONN POWYS WALES NEWTONN CRISS SZAS . 0



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(any model that receives BBC2) and a cassette player when using pre-programmed cassettes. And W.H. Smith have a range available from £3.95 each. So take your first steps in computing at W.H. Smith and make your life easier to run



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APPIF

- HOME : VTAB 12: HTAB 7: PRINT *ENTER # OF SECTIONS (2-6):
- 210 BET AM: FOR MX = 2 TO 6: IF AS . STRS (MX) THEN PRINT R&: HOME : 80TO 230
- 220 NEXT : 60TO 210 230 FOR J = 3 TO 6:S(J) = 0: NEXT .WU = 0.8(1) = A31 FOR J = 3 TO MX:S(J) = FN R(19) + 45 1 NEXT 1 IF MX = 2 THEN S(3)
- 240 MV = FM R(42) + 10: FOR J = 1 TO 15: IF MV = MT(J) THEN
- 250 NEXT (S(2) = 63 MV: MV = 0:
- 60SUB 680 260 HOME : HTAB 11: PRINT "WANT TO 60 FIRST? "11 GOSUB 1140
- BET AS: IF AS = "Y" THEN 300 280 IF AS = "N" THEN 490
- 290 8010 270 300 HOME : HTAB 13: PRINT "IT'S
- YOUR TURN, "B\$ 310 FOR 1 = 1 TO MX: IF TB(1) = TR THEN FOR P = 1 TO 1000; MEXT 1 PRINT 1 HTAB 3: PRINT "I 6 HESS YOU WILL CHOOSE SECTION
- *I* 1*R&R&: FOR P = 1 TO 45 001 NEXT : 80TO 360 320 NEXT 1 PRINT 1 HTAB 41 PRINT "ENTER SECTION #. OR O FOR Q
- UIT: "1 330 GET AS: IF AS = "Q" THEN TEXT 1 HOME 1 CLEAR 1 60TO 920
- 340 FOR 1 = 1 TO MX: IF AS = STRS (1) AND S(1) THEN PRINT BS: SOTO 340
- 350 NEXT : 60TB 330 360 CS# = ""; FOR B = 5 TO 0 STEP
- 1: IF SB(1.8) THEN CS8 = CS\$ + STR\$ (6 - B) + " "; 100



370 CS\$ = CS\$ + ". " TRO METT : POKE 34.15: HOME : HTAB

- 18: PRINT LEFTS (CSS.A): HTAR 18: PRINT MIDS (CS\$.7.6)
- IF TB(1) = 1 THEN PRINT : HTAB 2. PRINT "NOT MUCH CHOICE! I 'LL MOVE FOR YOU, "BABA: GOSUB 1170:MV = S(1):S(1) = 0: GOSUB
- ARO: SOTO 470 AGO PRINT : PRINT "THE PIECES IN SECTION "111" ARE SHOWN ARD UF. "1 POKE 34.20
- 410 PRINT "ENTER YOUR MOVE AS 1-3 ADJACENT DIGITS": INPUT "I N ASCENDING ORDER, & HIT 'RE TURN'1"1A\$1 IF LEFT\$ (A\$,1)
- . "D" THEN TEXT : HOME : CLEAR 1 GOTO 920 420 FOR J = 1 TO 15: IF LM\$(J) = AS THEN BOSUB 820: BOTO 450
- 430 NEXT 440 HOME : FLASH : HTAB 5: PRINT "THAT MOVE DOES NOT COMPUTE!

- 1140: FOR P = 1 TO 2000: WEXT 1 IF TR = 0 THEN 840 480 MV = 01 GOSUB 480
- 490 HOME : HTAB 14: PRINT "IT'S MY TURN "RE: PRINT : FOR P = 1 TO 1500: NEXT : IF TR (5 OR DF = 3 THEN 510
- 500 IF DF = 1 DR (RND (1) > .5 AND TR > 7) THEN 640
 - 510 POKE QL, QX; POKE Q3, FN G(S) 1)) + FOR J = 2 TO MX: POKE Q 1. PEEK (Q3): POKE Q2. FN 8(S(J)): CALL QB: NEXT J:SUM = PEEK (Q3)
 - 520 IE NOT SUM AND TR (5 THEN FOR P = 1 TO 1000; NEXT ; FLASH HOME : VTAB 15: HTAB 15: PRINT *1 RIVE UP! *1 BOSUB 1160: BOSUB 1170: MORMAL : 80TO 840 530 IF NOT SUM THEN 640
 - 540 IF TB (3 THEM HTAB 31 PRINT *SORRY ABOUT THIS MEXT MOVE. BUT..."; BOSUB 1120; BOTO 5
 - 550 IF TB (5 THEN HTAB 3; PRINT "I DON'T THINK MUCH OF YOUR
 - CHANCES!": BOSUB 1130 560 FOR P = 1 TO 5001 NEXT 1 POKE DI SUM: FOR I m 1 TO MY: POKE 92. FM 8(8(1)): CALL 98: IF

FN B(S(I)) > PEEK (Q3) THEN

- 58/ 570 NEXT : STOP : REM PROGRAM ER
- pnp 580 MB = PEEK (Q3): FOR J = 1 TO 15: BOSUB 820: IF NOT OK THEN
 - 400 590 IF FN B(S(I) - MT(J)) = WB THEN
 - A10 600 METT : STOP : REM PROGRAM ER
 - ROR 610 MV = MT(J):S(I) = S(I) - MV: GOSUB 6801 HOME : HTAB 2: PRINT "I 'VE REMOVED "TM" PIECE"11 IF
 - TM > 1 THEN PRINT "S": A20 PRINT " FROM SECTION "1","; GOSUB 1140: FOR P = 1 TO 2000: NEXT 1 IF TB = 0 THEN 1030
 - 630 MV = 0: BOSUB 680: BOTO 300 640 FOR P = 1 TO 1000; NEXT
 - 650 I = FN R(MX) + 1: IF NOT S(1) THEN 650
- 460 MV = MT(J):S(I) = S(I) MV: BOSUB HOME : HTAB 6: PRINT "YOUR M OVE IS DISPLAYED ABOVE. "1 GOSUB

": NORMAL : PRINT : GOSUB 11

60: GOTO 410 450 IF NOT OK THEN 440

680







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APPLE

- 660 J = FM R(13) + 1: 80SUB 820: IF NOT OK THEM 660 670 SOTO 610
- 80 TB = 0; FOR J = 1 TO 6:TB(J) = 0:TX = S(J): FOR B = 0 TO 5: T = TX / 2:TX = T:SB(J,B) = SBM (T - TX):TB(J) = TB(J) + SB(J,B): MEXT :TB = TB + TB(J): MEXT : IF MOT MY THEM 7
 - 00 590 TM = 01TX = MV1 FOR B = 0 TO 51T = TX / 21TX = T1MB(B) = SSM (T - TX)1TM = TM + MB(B
- 700 FOR J = 1 TO 6:ST#(J) = **: FOR B = 5 TO 0 STEP - 1: IF J (> 1 THEN 730
- 710 IF NOT MV THEN 730 720 IF MB(B) THEN STS(J) = STS(J
-) + *0 *1 60T0 750 730 1F SB(J,B) THEN ST\$(J) = ST\$
- 730 IF SB(J,B) THEN STS(J) = STS (J) + "X ": BOTO 750 740 STS(J) = STS(J) + ". "
- 750 NEXT : NEXT
- 760 J = 21K = 11L = 11 GOSUB 770: J = 31L = 71 GOSUB 770:J = 7 1K = 41L = 11 GOSUB 770:J = 8:L = 71 GOSUB 770: GOTO 780
- 770 PR6(J) = " + MID6 (ST8(K), L,6) + " + " + MID6 (ST8(K + 1),L,6) + " + MID6 (ST8(K + 2),L,6); RETURN
- 780 TEXT : HOME : VTAB 2: IF MX 4 THEN VTAB 5
 790 FOR J = 0 TO 4: PRINT TAB
- 7);PR8(J): WEXT: IF MX (4 THEM 810 800 FOR J = 5 TO 10: PRINT TABLE 7);PR8(J): WEXT
- 7) PRR(4)1 ME11 810 POKE 34,151 RETURN 820 OK = 01 POKE 01,0A1 POKE 01,8 (1)1 POKE 02,NT(3)1 CALL 601 1F PEEK (03) = MT(4) THEN
- OK = 1
- 830 RETURN 840 CLEAR IN = 5
- 850 TEXT : HOME 860 IF PEEK (175) + 256 t PEEK (176) < 8157 THEN HGR : GOTO
- 870 VTAB 12: HTAB 15: IF W = 5 THEN PRINT "YOU WIM!": GOTO 910
- 880 PRINT "I MIN!"; GOTO 910 890 ROT= 0: SCALE= 8: GOSUB 980: GOSUB 990: GOSUB 1010: GOSUB 980: FOR I = 8 TO 1 STEP -1: SCALE= I: GOSUB 940: MEXT

- 900 SCALE= 8: 605UB 990; FOR I = 1 10 32 STEP 4: R0T= I: 605UB 950: REIT: -R0T= 32; 605UB 9 90: R0T= 0: FOR I = 1 TO 8: SCALE= 1: 605UB 960? NEXT: 1 505UB 1000
- 910 FOR I = 1 TO 5s PRINT CHR\$
 (7): MEXT : FOR I = 1 TO 300
 0s MEXT
- 920 GOSUB 1110: VTAB 21: PRINT "
 WANT TO PLAY AMOTHER GAME? "
 J: SET A%: IF A% = "Y" THEM
 FOR I = 770 TO 906: READ J:
 NEXT : TEXT : HOME : BOSUB
 1180: BOID 160
- 930 TEXT # MOME > VIAB 11: HTAB 7: PRINT "IT'S BEEN FUN PLAY ING WITH "YOU." - PRINT : HTAB 7: PRINT "SO LONG UNTIL WEXT JUNE" - PRINT "CARS (7) - FAO
- 940 505UB 9801 505UB 9701 505UB 9801 RETURN
- 950 GOSUB 990; GOSUB 970; GOSUB 990; RETURN
- 960 665UB 1000; 605UB 970; 605UB 1000; RETURN 970 FOR J = 1 TO 5:K = PEEK (-
- 970 FOR J = 1 TO 5:K = PEEK (16336): MEXT : RETURN 980 XDRAM 2 AT 140,60: RETURN 990 XDRAM 3 AT 140,100: RETURN
- 1000 XDRAM W AT 140,60: RETURN 1010 FOR I = 1 TO 3: FOR J = 100 TO 30 STEP - 10:K = 5: 60SUB-10:20: MEXT : FOR J = 30 TO 1 00 STEP 10:K = 5: 60SUB-1020
- 00 STEP 101K = 31 80508 1020
 3 WEKT 3 MEXT 3 RETURN
 1020 POKE 768, J3 POKE 769, K3 CALL
 7703 RETURN
 1030 CLEAR 1M = 41 80TO 850
- 1040 HOME : HTAB 5: PRINT "IN TH 1S BAME, YOU AND I TAKE": PRINT "TURNS REMOVING PIECES FROM A DISPLAY": PRINT "SHOWN ON THE SCREEN. FROM 1-3 PIECES"
- 1050 PRINT "MAY BE REMOVED AT EA-CH TURM, BUT IF": PRINT "2 D R 3, THEY MUST BE ADJACENT E ITHER": PRINT "HORIZONTALLY
- OR VERTICALLY.": PRINT 1060 HTAB 5: PRINT "WHEN IT IS Y OUR TURN TO PLAY, CHOOSE": PRINT "FIRST THE SECTION OF THE DI SPLAY WHERE": PRINT "YOU WIS H TO MOVE. AND THEN SPECIFIC
- H TO MOVE, AND THEN SPECIFIC
 "1 PRINT "PIECES, WHICH YOU
 CAM PICK BY NUMBER."1 PRINT
 1070 HTAB 51 PRINT "THE PLAYER W
- HO TAKES THE LAST PIECE": PRINT
 "OF THE ENTIRE DISPLAY WINS
 THE GAME,": PRINT : HTAB 5: PRINT
 "YOU CAN VARY MY LEVEL OF SK
 III."

- 1080 PRINT "AND CAN ALSO WARY TH
 E INITIAL MUMBER"; PRINT "OF
 SECTIONS, FROM 2 TO 6. YOU
 HAME"; PRINT "YOUR CHOICE, A
 FIER SEEING THE INITIAL"; PRINT
 "DISPLAY, OF GOING FIRST OR
 SECONS.
- 1090 PRINT "THEORETICALLY, YOU C AN WIM EVERY GAME!": PRINT : GOSUB 1170: PRINT "HIT ANY KEY WHEN YOU ARE READY TO PL GY.": GOSUB 1110
- 1100 X = RND (1)1X = PEEK (1 6384)1 IF X (128 THEN 1100 1110 PDKE - 16368.01 RETURN
- 1120 POKE P1,255; POKE DU,190; CALL
 BE: FOR PA = 1 TO 50; MEXT:
 POKE DU,127; CALL BE: POKE
 P1,190; POKE DU,255; CALL BE
- : RETURN

 1130 POKE PI,180: FOR K = 1 TO 3

 : POKE DU,75: CALL BE: FOR P

 A = 1 TO 50: NEXT : MEXT : POKE
- PI, 228: POKE DU, 255: CALL BE 1 RETURN 1140 FOR I = 1 TO 8:J = 240 / I:
- POKE PI, J; POKE DU, I; CALL

 BE: NEXT : RETURN

 1150 POKE PI, 230; POKE DU, 255; CALL
 - 1150 POKE PI,230: POKE DU,255: C
 - 1160 FOR K = 1 TO 300;L = PEEK (CL): MEXT : RETURN 1170 FOR P = 1 TO 3000; MEXT : RETUR
- 1180 PI = 768:DU = 769:BE = 770:C L = -16336:B8 = CHR\$ (7): Q8 = 791:Q1 = 792:QL = 793:Q
- 2 = 794;03 = '799;0A = 41;0X = 73 1190 68 = "0112102312030334102301 3223303215509323340312302123 51320534254152": 1F LEN (66) () & 4 THEN STOP : REN E
 - 1200 DEF FM B(J) = VAL (MID\$ (B\$,J + 1,1)); DEF FM R(J) = INT (RND (1) \$ J)
 - INT (RMD (1) \$ J)

 1210 DIM LMs(15); FDR J = 1 TO 1

 5; READ LMs(J); MEXT
- 1220 DATA 1,2,3,4,5,6,12,23,45, 56,14,25,36,123,456 1230 DIM MT(15): FDR J = 1 TO 15
- 1 READ MT(J): MEXT 1240 DATA 32,16,8,4,2,1,48,24,6 3,36,18,9,56,7
 - 1250 PR\$(0) = " 1 2 3*1PR\$(10) = " 4

COMPUTER & VIDEO GAMES 41

A simple strategy game, Rain-

example of how a board game can be brought to life on a computer screen.

bow Passage makes good use of the Commodore VIC-20's colour graphics facilities and the addition of appropriate sound effects give a dimension which cardboard games cannot match.

Your objective is simply to get one of the diamond-shaped nieces at the bottom of the screen to the top of the board before the computer can move one of his tokens to the bottom.

Taking alternate turns, you and the computer each move one of your four tokens forwards,

either to the square directly in front or the one diagonally left or right.

You go first and indicate which piece you wish to move. Then the computer asks which of the three possible squares you wish to move onto. The only rule you have to follow is that the colour of the square you move onto must be the same as one of the colours directly in front of a computer piece.

These simple rules are the

foundation on which you will build a cunning colour strategy. Ideally you should select a route to the other side of the board which will always put the same colour directly in front of you, taking care first to position your other three tokens so that they

are behind the same colour. Should the idea of the computer begting you prove unbearable, fear not because the understanding VIC will let you cheat a little. But don't expect it to go unnoticed.

Watch out when opposing pieces get too close to one another as the rules allow pieces to be taken - although it is not always good tactics. Also be warned that if you move a piece onto a square already occupied by one of your pieces, you will be penalised.





```
REM RAINBOW PASSAGE -- FOR A 3.5K VIC-20
2 REM (C) I.A.STONES..MR.MICRO.LTD
4 DIMBKX(13,13),FX(13,13)
5 G=7680: C=38400: B=36879: POKEB, 8: PRINT " ="
6 BL=289: DI=218: BK=288: S0=36876: V=36878: N=36877
/ РКІМІТ. J. КНІМВИН РИБЗЕВИ. В FRND(1)#6+1,4:NEXTJ,I:60SUB9:60T021
8 FQR1=1T012:FCRJ=1T012:BKX(I,J)=RND(1)#6+1,4:NEXTJ,I:60SUB9:60T021
 9 REM
  10 U=0
  11 FORI=1T012
   12 P=G+89+22*I
   13 POKEP, 103: POKEP+13, 101
   14 FORJ=1T012
   15 POKEJ+P,80+128
   16 POKEJ+P+30720, BK%(I, J)
    20 PRINT"#"LEFT$(D$, 17)"
      22 FORI=1T012:FORJ=1T012:FX(I,J)=BK:NEXTJ,I
      23 FX(1,3)=BL:FX(1,5)=BL:FX(1,7)=BL:FX(1,9)=BL
       24 F%(12, 4)=DI:F%(12, 6)=DI:F%(12, 8)=DI:F%(12, 18)=DI
       25 GOSUB26: GOSUB32: POKESO, 0: GOSUB72: GOTO25
       26 FORX=1T012
       27 P=G+89+22*X
       28 FORZ=1T012
        29 POKEZ+P, F%(X,Z)
        30 NEXTZ, X: POKEN, 0
         32 PRINT" M"LEFT$(D$,19);:FORI=1T044:PRINT" ";:NEXT
          SS PUNITELLUZUS-ULLIME:NEXT
34 PRINT-WFLEFT$(D$,18)"POSSIBLE MOVES RRE-":GOSUB47:PRINT:PRINT"(EE'N' IF YOU'
           35 PRINT" #MOROW "TAB(16)" #YOUR MINISTED YOU FEET TO BE TO 
       RE STUCK
           36 GETR$: IFR$=""THEN36
           37 IFR$="M"THENRETURN
           38 IFA$>"M"ORA$<"A"THEN36
            39 PRINTAS : PRINTTAB(16) " #COL
            41 PRINTB$;:IFB$>"L"ORB$C"R"THENPRINT"# #";:GOTO48
            41 PKINIDAS IPDAS E WARAS H INCREMENTAL BEST MERBOR MERBOR SET GHT MERBORS ()
42 PRINT PRINT SET FIB (16) "SUSP, MERBOR SET, MERBOR MERBOR SET GHT MERBORS";
             44 PRINTCS: IFCS="U"ANDCSO"L"ANDCSO"R"THENGOSUB96:GOTO35
               46 PRINT" # FORI=1T010: PRINTTAB(16)"
              45 GOT 059
              47 X=0:FORI=1T012:FORJ=1T012
               48 IFFX(I, J)=BLTHENLX=BKX(I+1, J):GOSUB50
```

49 NEXTJ, I : RETURN

50 C(X)=L%: X=X+1

51 PRINT": ONL%GOT052,53,54,55,56,57,58



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PASSAGE

```
52 PRINT"#HHITE"; : RETURN
53 PRINT" RED"; RETURN
54 PRINT" CYAN"; : RETURN
55 PRINT PURPLE"; RETURN
56 PRINT"MOREEN"; RETURN
57 PRINT" BLUE"; : RETURN
58 PRINT TYELLOW"; RETURN
59 R=RSC(R$)-64: B=RSC(B$)-64
60 IFC$="U"THENC=0
61 IFC$="L"THENC=-1
 62 IFC$="R"THENC=1
 63 IFFX(A, B) ODITHENGOSUB96: GOTO35
 65 IFA-1=1THENPRINT"#MYOU WIN!!!!":GOTO105
 67 F=0:FORX=0T03:IFBKX(A-1,B+C)=C(X)THENF=1
 68 NEXT: IFF=1THENF=0:G0T071
 69 PRINT" MONCHEAT!
 70 POKEN, 150: POKEY, 15: GOSUB97
     GOSUB103:GOSUB26:GOTO46
     PRINT" MIN MY MOVE"
  73 FORI=1T02000: NEXT
  74 PRINT MAIN
  75 Z=0:F0RI=1T012:F0RJ=1T012
     IFF%(I, J)=BITHENG%(Z)=BK%(I-1, J):Z=Z+1
     POKEY,7: POKESO, RND(1)*128+128
   78 NEXTJ, I POKEV, 0
   79 FORI=11T01STEP-1
80 FORJ=11T01STEP-1
   81 IFF%(I, J)=BLTHENGOSUB85
   83 IFK=0THENPRINT" SMMI 'M STUCK"
   82 NEXTJ, I
   84 K=0: RETURN
   86 FUNCE-1101:FURNIFIGURE
87 IFEKCX[1:], J+2)=0X(0)THENFX(I,J)=BK:FX(I+1,J+2)=BL:J=1:Q=3:Z=1:K=1
   88 IFK=1THENPOKEV,9:GOSUB103
    90 GOSUB26:IFK=1ANDI=11THENPRINT"#MHOORRY I'VE WON!!":GOTO105
    91 POKESO, 0: IFK=1THENI=1
    92 IFK=0THENPRINT" SOMHMMM!!
    93 FORX=1T01000 NEXT
    94 PRINT MIN
    95 RETURN
                       INVALID MOVE!
    96 PRINT" HIN
    97 PRINT" MININ";
     98 FORI=1T011
     99 PRINTTAB(16)"
     100 NEXT
     101 FORZ=1T06000: NEXT
                                           ":RETURN
     103 POKEY, 15: FORS=128T0200: POKESO, S: NEXT
     102 PRINT" MINI
     104 POKEV, 0: POKES, 0: RETURN
     105 FORI=1T050:G0SUB103:NEXT:RUN
    READY.
```

nibblers runs on a 32 column Pet in 8K. By Paul Jay

A swarm of locusts has nothing on the Nibblers. And trying to keep the little devils in check can be a fulltime occupation as they try to eat their way through a dam protecting the town lying

From a bomber plane, next to it. patrolling the skies above the town, your task is to blast the Nibblers as they swoop over the town to bite chunks out of the dam with their

iron-like jaws. The dam is located on the left hand side of the screen and players can choose their own thickness - but be warned. Nibblers make short work of thin dams. While you're getting the hang of the game it is best to keep the dam at its thick-



IARF OF

From the right hand side of the screen come the high speed nibblers flying at different levels randomly generated. Some attack the dam at its highest point. Others are low-flying and move in to take chunks out of the town on the way.

For each Nibbler bombed the player

you have notched up five points (then you get another round of the game) or, if the Nibblers are a better aim than the bomber pilot, when they bite through any section of the dam.

Can you kill off the Nibblers without destroying the town underneath - it's a real test of marksmanship and

much damage to the town you are trying to protect as the Nibblers themselves.

Follow those gleaming jaws across their flight paths and aim carefully. When the plane is hovering directly above the Nibbler drop your bomb, then speed back ready for the next creature.

It's fairly easy to shoot down the high flying Nibblers but watch out for those crafty lowflying ones — especially those hard to spot ones just above building level.

Once you've got the knack of defending the town from the Nibblers with a thick dam, then try with a thinner one. Paul Jay has come up with an original game which is still addictive

and enjoyable. panic firing can do as scores one point. The game is over either when ost. 46 COMPUTER & VIDEO GAMES

10 M1=59467: M2=59466: M3=59464 98 PRINT®" SC#8: BU#33588 48 INFUT*THICKNESS OF DIKE 1-3 (1=MPRIEST)*, DT FRINT® 29 6010760 ed KEM JUNE 70 FOR[=3004070337285TEP40 FOR]=0T010 FOKE[+J,150 NEXTJ:NEXTI 50 IFDT>30RDTC1THEN40 78 HUK1#368481USSF6351EM40 FUK3#81U38 FUK 88 FUR1#36819TUSS739STEP40 FUKE1 238 HEXT 100 DT=BT=2 110 FDRI=32528T0337405TEP40 FOR:1=0T0DT-POKE[+],102 NEXTI NEXTI 60 REM DIKE 120 PEN BULLBINGS 130 POKEBU-236 PUNEBU+1, 251 POKEBU+40, 252 POKEBU+61, 254 130 POKEBU+7, 256 PUNEBU+43, 37 TOKEBU-73, 37 FOKEBU+80, 252 POKEBU+80, 252 140 FORWERDEN AND POKEBU+73, 37 TOKEBU-73, 37 FOKEBU-80, 352 POKEBU-80, 354 90 IFDT=1THEN120 110 POKEBU147, 236 POKEBU143, 37 FOKEBU179, 37 FOKEBU193, 252 POKEBU181, 253 130 POKEBU194, 38 FOKEBU197, 236 FOKEBU193, 277 FOKEBU197, 235 130 POKEBU194, 38 FOKEBU197, 236 FOKEBU193, 277 FOKEBU197, 236 POKEBU197, 23 150 POKEBUH-04, 88: FOKEBUH-07, 236 - POKEBUH-03, 97: FOKEBUH-01, 225: POKEBUH-01, 225: POKEBUH-10, 235: POKEBUH-13, 237: FOKEBUH-13, 237: POKEBUH-13, 237: POKEBUH-13, 238: POKEBUH-13, 238: POKEBUH-124, 227: POKEBUH-127, 236: POKEBUH-128, 97: 130: POKEBUH-128, 237: POKEBUH-128, 238: POKEBUH-124, 237: POKEBUH-127, 236: POKEBUH-128, 97: 130: POKEBUH-128, 238: POKEBUH-124, 237: POKEBUH-128, 238: POKEBUH-128, 100 POKEBU+125, 223 100 POKEBU+125, 223 POKEBU+132, 254 POKEBU+133, 254 POKEBU+134, 254 POKEBU+156, 254 100 POKEBU+13 254 POKEBU+137, 254 POKEBU+154, 252 POKEBU+156, 254 POKEBU+156, 225 200 POKEBU+130 254 POKEBU+130, 203 POKEBU+159, 97 POKEBU+160, 252 200 POKEBU+130, 100 POKEBU+150, 203 POKEBU+159, 97 POKEBU+160, 252 210 POKEBU+157,108 POKEBU+158,233 POKEBU+159,97 POKEBU+160,252
200 POKEBU+161,254 POKEBU+158,235 POKEBU+163,257 POKEBU+164,236
200 POKEBU+161,254 POKEBU+167,236 POKEBU+163,257 POKEBU+169,396 POKEBU+176,227 POKEBU+169,396 POKEBU+176,227 POKEBU+174,227
200 POKEBU+175,227 POKEBU+176,227 POKEBU+177,227
200 POKEBU+175,227 POKEBU+176,227 POKEBU+177,227
200 REM INSIDIN FOR IN FIGHT COLUMNI. 260 REM RANDOM FOS IN FIGHT COLUMN 250 MEN MAMMUNI PUS IN MIDITE DUBLING 278 QC=1:BB=INT(23#FND(1)+1)#48+32847 280 REM NIBBLER ON 290 B1=PEEK(BB) 300 POKEBB, 61 310 FORI=1T029:NEXT 329 POKEBB, 62

348 | TEBI-230THENPOICEBB, 32 FOICEBB+41, 223 (070548) | TEBI-130THENPOICEBB, 32 FOICEB1, 15 FOICEB2, 60 FOICEB3, 189 FOICEB1, 8 (070278) | TEBI-130THENPOICEBB, 32 FOICEB1, 15 FOICEB2, 60 FOICEB3, 189 FOICEB1, 8 360 P=151 L=PEEK(P) 370 IFL=1ANDQQ=1THENGQTQ418 380 POKEBB, B1 390 BB=BB-1 488 GOT0298

430 PUKEA1, 16 POKEM2, 35 FOKEM3, 208 POKEM1, 8 410 FORZ1=32768T032897 440 P=151 L=PEEK(P) 498 FDROX=Z1T0337675TEP48 FDKEIOL46 500 TFEEKCKXX4483 =62THEREWEIDLX, 32 FDKEXX443, 32 FDKEXX480, 32 60SUB689 :00T0128 100 TEPEKXXX4483 =62THEREWEIDLX, 32 50KEXX440, 32 FDKEXX480, 32 60SUB689 :00T0128 450 IFL=6THEN490 460 POKEZ1,32 479 NEXTZI SUB 1FFEER(COV+48) = BX11HE19FUREDOV-32 FOREDOV+45 518 1FPEER(COV+48) = 32THENFOREDOV, 32 · O(±33767

520 POKEXX, 32 NEXTXX: 00=0 530 0010380 540 FORL=8B+81T033767\$TEP40 FOKE[,160 NEXT] - 040 TURKI EBBHSTIUSS/FOTEMAUS-FURCEL/LEUINEKII 545 POKEMI, 16-POKEM2,25-POKEM3,120 POKEMI,0 530 GOT0380

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Bits & Picca. Nathwella, Sal. (2012; 61746). Datasa. Mikasa. Centre Lida Seelinka. Hi (2012). 980-914. Maddensferld. Computer C. Maddensferld. Computer C. Microso (3D.P). Lidd Datingson, Rol. (2022). 990-94. Superior Systems Lidd Seelinka. Sci. (2012). 290-90. San. Computer Services L. San. Songuette Services L. San. Songuet 550 FORI=32848T0BBSTEP40:FORJ=0T010:POKEI+J,32:NEXTJ:NEXTI 560 FORI=33767T0BB+40STEP-1:POKEI,160:NEXTI

950 PRINT MASUNDER! (WHATEVER THAT MEANS). GOOD LUCK.

960 POKE152,0:WAIT158,1:POKE152,0

970 GOTO30 READY.

578 PRINT" MANAGEMENT DESCRIPTION IS FLOGDED 600 IESCOTSTHENTS=S 630 POKE158, 0 640 GETA\$ 650 IF8\$=""THEN640 660 IFA\$="Y"THEN30 680 SC=SC+1 690 POKEM1,16:POKEM2,25:FORKK=155TO1STEP-1:POKEM3,KK:NEXTKK:POKEM1,0 700 FORI=0T0100STEP10 720 POKE33332, (I/10)+48 730 POKE33333, (SC-I)+48 740 RETURN 750 NEXTI 760 FORI=1T0100 780 PRINT" TO BEDDER DE DE DE DE DE DE LERS" : NEXTI 790 PRINT"MADDODDDDDDBY PAUL JAY. 1981" 800 PRINT" MANAGEMENTAL STATES (Y/N)" 810 GET9\$: IE9\$=""THEN810 820 JFAS="Y"THEN840 840 PRINT"TYOU ARE THE MISSILE-LHUNCHING MAN" 850 PRINT"MOF A SMALL DUTCH TOWN. (A DUTCHY)" 860 PRINT"NA MISSILE-LAUNCHING MHN (OR WOMAN'S)" 870 PRINT WIJOB, IN CHSE YOU DON'T ALREADY KNOW, " 880 PRINT"MIS TO PROTECT THE TOWN'S DIKE 890 PRINT "MINIBBLERS FROM OUTER SPACE !" 900 PRINT"WTO LAUNCH 8 MISSILE, PRESS #= " 910 PRINT"MTO DROP A BUMB, PRESS #SPACES" 920 PRINT"WIF THE DIKE SHOULD BE NIBBLED THROUGH" 930 PRINT" WITHE SURVIVING TOWNSFOLK WILL GRAB YOU " 940 PRINT"MBY THE #DAFFODILS# AND CAST YOU"



LE DIABLE.



intriguing program as a party piece or give it some deeper significance. The Tarot pack is the forerunner of modern-day playing ner or arousern-our Praying cards. There are 78 cards in all. divided into 22 major arcana, or trump-cards, and 56 minor carcana cards, with four suits of

14: cups, coins, swords and wands (or sceptres). As in a modern pack, there are ns in a monein pack, mere are 10 numbered cards in each suit but there are four face cards: youth, horseman, queen and king (in some packs the knave

nature resent that or man, th that the random This T

Egyptian card "Yes The com enter a q answered b have done deals out fiv left. The first the past as it tion. The cer represents the

last two cards - indicate the The answer to then determined cards are dealt upside down. A the bottom of each right way up.

A card right side a "yes" response, u

LE MAT



1590 IFR-12PRINTON, QUEEN';

1600 IFReligeriation, KING*

1610 IFR=14PRINTAN, "HORSEMAN";

1620 Ma9+(I-1) #26: Ye21: [FA(D) (0Ye5

1630 FORYWRTON+5:SET(V,Y):MEXTV:RETURN

female. With the queen this rule

The horseman card indicates

either good or bad situations.

Right side up it represents good.

upside down it indicates bad.

is reversed.

each card if it is the

side up indicates

se, upside down it

COMPUTER & VIDEO GAMES 51

TANDY

1A40 PRINT2195+(X-1)#13, "MAJOR"::PRINT2258+(X-1)#13, "ARCANUM":

1650 W=323+(Y-1)\$13:[FR=1PRINTSW. " [": 2410 DATA9.5. WISDOM AND PRUDE, NCE 1840 IFR=2PRINTSN." II": 2420 DATA9. 1. WISE AND PROFIABLE ERIENDSHIP 1670 IES-TOSINTAM . III. 2430 DATA9, 2, EMOTIONAL STABIL, ITY 1ARO IFR#APRINTAN. " IV": 2440 DATA9, 3, INCREASE OF INCO.ME 1690 IFR=SPRINTAW." V": 2450 DATA9, 4, LOSS OF FRIENDSH, IP 1700 IFR=&PRINTAM. " VI": 2460 DATA10.5. CHANGE OF FORTUN.E 1710 IFR=7PRINTSW. * VII*: 2470 DATA10.1.A CHANGE IN STATLIS 1720 IFR-SPRINTAN, " VIII": 2480 DATA10, 2, INCONSISTANT EMO, TIONS 1730 IFR=9PRINTAM. " IX": 2490 DATA10.3.FINANCAL LOSS AN.D BAIN 1740 IFR=10PRINTON, " 1"; 2500 DATA10, 4, UNCONVENTIONAL A, CTIONS 1750 IFR=11PRINTAN, " 11": 2510 DATA11.5. MORAL FORCE. 1760 IFR=12PRINTSN. * XII*: 2520 DATA12, 5, DISAPPOINTMENT. 1770 IFR=13PRINT@W. * #1111*; 2530 DATA13,5, DEATH OR TRANSFO, RMATION 1780 IFR=14PRINTOW, " IIV"; 2540 DATA14, 5, DILIGENCE TO REA, CH SDAL 1790 IFR=15PRINTON, " 1V"; 2550 DATAIS, S. FATALITY OR BLAC, K MAGIC 1800 IFR=16PRINTOW, " IVI 2560 DATA16.5. ACCIDENT OR CATA. STROPHE 1810 IFR=17PRINTSW. * IVII*: 2570 DATA17.5. OVERCONING PROBLEMS 1820 IFR=18PRINTaw, "IVIII"; 2580 DATA18.5. DECEPTION. 1830 IFR=19PRINTOW, " XIX": 2590 DATA19,5, HAPPINESS OR JOY. 1840 IFR=20PRINTAM. * II*: 2600 DATA20.5.AWAKENING OR RES.URRECTION 1850 IFR=21PRINTOW, " III": 2610 DATA21, 5, SUCCESS OR ATTAI, NMENT 1860 IFR=22PRINTAW, " IIII": 2620 DATA22.5, SUFFERING FOLLOW, S SIN 1870 SOTO1620 2430 DATA13.1.OF AN ARIES TEMP. FRAMENT 2000 REM 1 DATA FOR CARDS 1 2640 DATA13, 2, OF A TAURUS TEMP, ERAMENT 2010 DATA1.5. WILL P.OWER 2650 DATA13, 3, OF A GEMINI TEMP, ERAMENT 2020 DATAL, L. NEWS OF A BUSINE, SS OPPORTUNITY 2660 DATA13.4. OF A CANCER TEMP, ERAMENT 2030 DATA1.2.MO.DDS 2670 DATA12.1.OF A LED TEMPERA.MENT 2040 DATA1.3.REWARD.S 2680 DATA12, 2, OF A VIRGO TEMPE, RAMENT 2050 DATA1.4. COMMUNICATION PR. OBLEMS 2690 DATA12.3.OF A LIBRA TEMPE. RAMENT 2060 DATA2, 5, REVELATION THROU, SH SCIENCE 2700 DATA12, 4, OF A SCORPIO TEM, PERAMENT 2070 DATA2.1. SUCCESS IN BUSIN. ESS VENTURES 2710 DATA11,1,OF A SAGITARIAN , TEMPERAMENT 2080 DATA2, 2, A WORK OF LO, VE 2720 DATA11, 2, OF A CAPRICORN T, EMPERAMENT 2090 DATA2.3.FINANCIAL SAIN T. HROUGH WORK 2730 DATA11, 3, OF AN AQUARIAN T, EMPERAMENT 2740 DATA11, 4, OF A PISCES TEMP, ERAMENT 2100 DATA2.4. MARTYROOM AND ST. RENGTH 2110 DATAS, 5, MARRIAGE OR ACTI, ON 2750 DATA14, 1, ADVANTAGEOUS THO, UGHTS 2120 DATAS, 1. TAKE ACTION FOR . THE FUTURE 2760 DATA-14.1. THOUGHTS OPPOSE, D TO BUSINESS 2130 DATA3, 2, ROMANTIC ACTIVIT, Y 2770 DATA14.2. THOUGHTS FOR PRO. MOTION 2140 DATAS, S. SAIN THROUGH SOC, IAL ACTIVITIES 2780 DATA-14, 2, PLANS AND DESIRE, S FOR DOWNFALL 2150 DATAS, 4, ACTIVITY TO OVER, COME ADVERSITY 2790 DATA14, 3, THOUGHTS TO INCR. EASE POSPERITY 2150 DATA4, 5, ABUNDANT CREATIV. E ENERGY 2800 DATA-14, 3, PLOTS FOR UNFAI, R ADVANTAGE 2170 DATA4, 1, SUCCESSFUL ENTER, PRISE 2810 DATA14.4.SINCERE THOUGHT.S 2180 DATA4, 2, RESOURCEFULME, SS 2820 DATA-14, 4, DECEIT AND LIES, 2190 DATA4.3. UNEXPECTED FINAN, CIAL BAIN 3000 REM # PRINT MESSAGES # 2200 DATA4, 4, FINANCIAL REVERS, ES 3015 RESTORE: IFX=5PRINT@897, *(1) *: 2210 DATAS, 5, HELP THROUGH INS. PIRATION 3020 IF1=4PRINTSR33.*(2) *: 2220 DATAS, 1. GAIN THROUGH SPE, CULATION 3030 IF1=3PRINT2789.*(3) *: 2230 DATAS, 2, RESPONSIBILIT, Y 3040 IFX=2PRINT@705, *(4) *: 2240 DATAS, 3, PROFITABLE EVEN, T 3050 IFX=1PRINT@641, "(5) "; 2250 DATAS, 4, OBSTACLES OVERCO, ME BY FAITH 3060 IFS=560T03120 2260 DATA6.5. STABILIZE EMOTIO. NS 3070 IFR>1080T03350 2270 DATA6, 1, AMBITIO, N 3080 READU, V, A4, B\$ 2280 DATA6, 2, USE CREATIVE IMA, SINATION 3090 IF (R=U) # (S=V) 60T03110 2290 DATA6.3. PROFIT FROM SOCI.AL AFFAIRS 3100 B0T03080 2300 DATAS, 4, TEMPTATION RELAT, ING TO BUSINESS 3110 PRINTAS: BS:: RETURN 2310 DATA7.5.SUCCESS THROUGH .INTELLIGENCE 3120 PRINT* (*1: IFR=1PRINT*THE MAGUS*: 2320 DATA7, 1, SPREAD OF CONSTR, UCTIVE IDEAS 3130 IFR=2PRINT*VEILED ISIS*: 2330 DATA7, 2, RESOLUTION OF DO, MESTIC DISCORD 3140 IFR=3PRINT*ISIS UNVEILED*: 2340 DATA7.3. PROFIABLE VENTUR.E 3150 IFR=4PRINT*THE SOVEREIGN*: 2350 DATA7, 4, PROGRESS AFTER C, ONFLICT 3160 IFR=SPRINT*THE HIEROPHANT*; 2360 DATAB, 5, MODERATION IN AL, L THINGS 3170 IFR=6PRINT*THE TWO PATHS*:

2400 DATAB. 4. STRUBBLE TO MAIN. TAIN BALANCE

3180 IFR=7PRINT*THE CONQUEROR*:

3190 IFR=8PRINT*THE BALANCE*:

3200 IFR=9PRINT*THE SAGE*:

2370 DATAB, 1, BUSINESS INITIAT, IVE SUCCESS

2390 DATAB. 3. FINANCIAL PROBLE. MS

2380 DATAB, 2, BLEND OF PRACTIC, AL WITH IDEAL



LAJUSTICE





LAMOURE



LA FORCE

SECRETS OF THE

- 3210 IFR=10PRINT*THE WHEEL*: 3220 IFR#11PRINT*THE FMCHANTRESS*:
- 3230 IFR=12PRINT*THE MARTYR*:
- 3240 IER=13PRINT*THE REAPER*
- 3250 IFR=14PRINT*THE ALCHEMIST*;
- 3260 IFR=15PRINT*THE BLACK MAGICIAN*:
 - 3270 IFR=1APRINT*LIGHTNING*:
- 3280 IFR=17PRINT*STAR*: 3290 [FR=18PR]NT*MOON*;
- 3300 IFR=19PRINT*SUN*:
- 3310 IFR=20PRINT*SARCOPHAGUS*:
- 3320 1FR+21PRINT*A0FPT*:
- 3330 IFR=22PRINT*MATERIALIST*:
- 3340 PRINT*) ****\$0103080
- 3350 IFR=1480T03390
- 3360 IF((A(L+I))0)1((R=11)+(R=13)))+((R=12)1(A(L+I)(0))80T03380
- 3370 PRINT"A WOMAN ":: S0T03080
- 3380 PRINT'A MAN "::60T03080
- 3390 Y=R: [FA(L+X)(0Y=0-Y 3400 READULY, 45. R5: 1F (U=Y) 1 (S=V) S0T03110
- 3410 80703400
- 4000 REM I START A NEW LAYOUT I
- 4010 D=0:FORI=1T078:A(D+I)=I:NEITI:L=78:FORU=1T05:S0SUB1000:A(L+ U) =A(D):NEITU
- 4020 CLS:PRINT@12,CHR#(34); "YES AND NO"; CHR#(34): " SPREAD USING
- TAROT CARDS*: 4030 PRINTa192, "PLEASE ASK A QUESTION THAT CAN BE ANSWERED BY ":
- CHR\$ (34): "YES": CHR\$ (34): " ": 4040 PRINT*OR *: CHR\$ (34): *NO*: CHR\$ (34)
- 4050 PRINT2320, "1: INPUTAS: PRINT2576, CHR\$ (34); A5;
- 4053 IFRIGHT\$(A\$.1)(>*?*THENPRINT*?*1:A\$=A\$+*?*
- 4056 PRINTCHR\$ (34) 4060 PRINT2704. "IS THIS YOUR QUESTION (YES OR NO) ":: INPUTIS
- 4070 IFX\$="NO"80T04020

ARD":: INPUTAS

- 4075 IF18="N"80T04020 4080 GOSUB1100:FORX=ST01STEP-1:1FX>OPRINT#577.*HIT 'ENTER' FOR C
- 4083 PRINT2577.* *: A(D) = A(L+X): R=INT(ABS(A(D
-))/10):S=ABS(A(D))-10#R 4090 GOSUB1500: GOSUB3000: NEXTX: Y=0: FORX=1TO5: IFA(L+X) >0Y=Y+1
- 4100 IF(I=3) #(A(L+I) >0) Y=Y+1 4110 NEXTX: PRINT2577. **:: IFY=3PRINT*THE ANSWER IS UNCERTAIN. *:
- 4120 IFY(3PRINT*THE ANSWER IS "; CHR\$(34); "NO"; CHR\$(34); "."; 4130 IFY>3PRINT*THE ANSWER IS ":CHR\$(34):"YES":CHR\$(34):".":
 - 4140 INPUT* (HIT 'ENTER' FOR ANOTHER READING) ": As: RETURN





ROLDE BATOX



LE PENDI





A Fast finger on the bomb-bay doors is needed to biast your way through the city to a safe landing.

City Bomb runs in 2K on a Sinclair ZX80 or ZX81. By Stephen Adams



This is the game for those people who think only of themselves. Flying above a city full of people you find yourself running out of fuel and not a landing strip in

Hmmmm! No parachutes sight.

There's only one thing for it. you'll have to blow away the eitherl entire city to make a landing strip for yourself. If you attempt to land before the city has been cleared then you will crash.

The program produces a city from lines 11 down to 19 across on the screen. Should you wish to make it harder for yourself alter the first "11" in line number 60 to a greater number and the second to a smaller number.

The program was written for an 8K ROM ZX80. To convert to a ZX81, remove lines 170 and 520 to improve the picture. Both programs are under 2K long

PRINT DO YOU WISH INSTRUCTIONS

IF CODE C\$=62 THEN GOTO 800 20 30

FOR Y = INT(RND*11)+11 TO 19 PRINT AT Y.X: "":

70 NEXT Y 80

100 LET AS="> = 1 10 LET CS=" 120 FOR H=1 TO 20 STEP 2

130 FOR X=0 TO 31

140 FRING AS H.A.AN: 150 LET F = PEEK PEEK 16398 +1+ PEEK 16399*256) 160 IF NOT F=118 AND F>

180 IF INKEYS () THEN GOTO 500 170 PAUSE 100 190 PRINT AT H.X:CS:

200 NEXT X

220 PRINT AT 0.10:"WELL DONE"

500 FOR Y = H+1 TO 19 230 STOP 510 PRINT AT Y.X."

520 PAUSE 5 530 PRINT AT Y.X: "

540 NEXT Y 550 PRINT AT H.X:CS 560 LET X = INT (RND*2)+X)

700 PRINT AT 0,10: ">=YOU CRASHED FRIEND AT U.SU: /= IOU CRASHED

(=".H3]+X:"POINTS"."ANOTHER GO?(Y)"

720 IF CS = Y" THEN GOTO 10 710 INPUT CS

800 PRINT CITY BOMB BY S.C.ADAMS" 730 STOP

820 PRINT YOU MUST BOMB AWAY THE CITY 830 PRINT BY PRESSING THE NEW LINE 810 PRINT 840 PRINT KEY BEFORE LANDING

850 INPUT CS 860 GOTO 40



PET HI-RES!

If you're a PET owner then there must have been a few occasions when you wished that

it had the graphics capabilities of the APPLE

Of course there has been a high-resolution board around for some time — but only now can you buy one for under £300. The IR+30 HIGH RESOLUTION GRAPHICS BOARD offers maximum possible resolution (320 by 200), but costs just £149 plus VAT, half the price of the competition! Because the IR+30 board was designed and manufactured in Britain we've been able to keep the price down without restricting its capabilities. And if you're really hard-up and a dab hand at soldering you might prefer to wait for the kit version (due later this year) which will cost £99 plus VAT without software.

The assembled board is supplied with 8k of RAM and utility software in EPROM, so that PET's own RAM is entirely available to the user. Though the graphics RAM uses addresses normally represented by the ROM sockets UD3 and UD4, these sockets are duplicated on the HR-40 board and are software selectable. The board may be installed

WITHOUT SOLDERING OR TRACK-CUTTING

At present the board will fit a standard PET or CBM computer with the nine inch screen, but we hope to have a version for twelve inch models very soon. Write or telephone for more details and up-to-date information.

SUPER GLOOPER

First in our new range of ARCADE style games for the PET, SUPER GLOOPER will have you on the edge of your seat. Your task is to clear the screen of little dots scattered in a maze, but WATCH OUT FOR THE GLOOPER EATERS, they're liable to escape from their pen and come after you.

You've got to be very nimble with the eaters on your trail. Best bet is to make for one of the four corners where (unless you've been there before) you will find a much larger dot which refreshes the parts that other dots cannot reach! Now you've got the glooper eaters on the run — catch one and you'll earn a bonus, but you must be quick, because any moment they'll recover from their shock and come after YOU.

METEORITES

An all-action game in the style of INVADERS. Your mission — to defend seven moon bases against a shower of meteorites by blasting them out of the sky. If you survive the first wave there are five more to face, and then — well you'll find out! The graphics are really superb — just watch the way that the ground shakes when a meteorite crashes into the lunar surface.

SUPERSOFT arcade games are written in machine code for speed and run on all 40 column PETs with BASIC 2, 3 or 4. At just £8 plus VAT, they fer early good value and you won't find a more exhilarating game at any price! We've more great games on the way—including some for the 8032 and VIC-20!



SUPERSOFT

First floor, 10-14 Canning Road, Wealdstone, Harrow, Middlesex Phone: 01-861 1166. ASK FOR OUR FREE CATALOGUE!



Relive the final climactic

TRENCH RUNS ON AN ATARI 400 OR 800 IN 16K. By Tim Hays.

As you thrilled to Star Wars back in 1978 you probably didn't realise that you would be able to partake in that climactic battle-against the Death Star just three years

later. The object of this program is to destroy the Death Star by manoeuvring your ship away from the crossfire until you reach the exhaust vent of the artificial planet and there you fire your photon torpedoes down the trench . . . hence the name of the game.

At the beginning you are already in the trench flying down the corridor at your ship's top speed. There are laser posts located on the left and right walls and on the floor bottom.

These lasers flash by you and fire on your ship at random intervals. The frequency of the fire from the laser posts is determined by the level of difficulty you choose, (1-19), with version No. 1 being the hardest.

All three lasers will aim independently. Each will fire at the mid point between you and the last spot fired upon. So as long as you keep your ship moving away from the three laser shots and keep track - you should not get hit.

You will see the number of miles you still have to travel along the Death Star's surface at the bottom of the screen. This will be further at the more difficult levels of play

When the distance to go reaches 20, the onboard attack computer

lasers will stop firing at you and the end of the trench will come into view. You now have to quickly line up the centre (one pixel) of this screen so well that the exhaust vent is dead centre of your sights. When you approach

the last 30 miles set your ship close to the centre so you can line up the approaching target more easily.

When everything is lined up (you hope), fire on the vent after the bottom wall is below the bottom of your sights and the target is close enough to be hit accurately (the computer will

prompt you with 'Fire

Nowl If you succeed in hitting your target, you must immediately pull back on your joystick to bring yourself up and out of the trench. Failure to do this will mean your mission ends with you

and the spacecraft splat-

tered all over the end of

the trench wall As you pull out of the trench the screen will go back to normal mode and show a window view of your ship moving out of the trench, before switching to a rear view showing the Death Star being

destroyed. During your flight down the trench. remember that if you go too close to the sides of the corridor or the floor. you will run into them and be destroyed. Should you go off the top of the screen, you will be out of the trench and your mission will be aborted, so a steady hand is needed on the controls.

Variables used in the game are as follows (please note that many are used more than once. or for more than one item storage or loop): A Looping

(FOR-NEXT) RND GOSUB of laser fire dependant on 'R'. Screen refresh

(redraw what was erased by shin & lasers) 'X' Position of

upper-left lager post. Y' Position of upper-left lager

post 'X' Position of upper-right laser

Y' Position of upper-right laser post & 'X' size of the target wall.

н 'X' Position of bottom laser post & 'Y' size of target wall.

Y Position of bottom laser post. Length of time

until ship runs into wall Input level of

Miles left to target.

FOR-NEXT loops. control var., colour locate var. Ship positioning.

Used as a TRUE/FALSE vor (eg. IF Z = 1 THEN

STRIG Status of joystick trigger.

positioning status. Used the same as

U Looping (nested with Th.

Ul Nested looping with 'U'. Wait looping nested with 'Ul'

ATARI

0 REM THE TREMCH 6/10/80

1 REM BY TIM HAYS SEBREE'S COMPUTING 2 REM 456 Granite Ave., Monrovia, CA.

3 REM When INPUTing this Program, DON' T leave unnecessary SPACES. You may ru n over the program LINE if you do. A DEM Then the ATART will MOT accept t

4 REM Then the ATARI will MOT accept the line. Pay particular attention to the long lines FROM 60 TO 110.
5 TRAP 10:GRAPHICS 0:POKE 752,1:F=90:6

=20:H=130:H=30:POKE 764,255:POSITION 6 ,10:? "INPUT LEVEL OF DIFFICULTY" 10 INPUT R:T=125-(RE5):? "## Press TRI SEER to start TRENCH ##" 13,55:PLOT 145,9:DRAWTO 145,72:COLOR 3 :PLOT 159,0:F=(F+X)/2:B=(B+Y)/2:DRAWTO

F,8
72 IF (F)X-5 AND F(X+5 AND G)Y-2 AND G
(Y+2) THEN 400
73 CDLDR 4:PLDT 159.0:DRAWTD F,G:SOUND

1,0,0.0 RETURN 80 COLOR 2:PLOT 63,49:DRAWTO 96,49:PLO 7 AL 59:DRAWTO 113.59:PLOT 18,71:DRAWT

0 143,71:COLOR 4:PLOT 63,49:DRAWTO 96, 49 81 SOUND 1,40,8,8:PLOT 43,59:DRAWTO 11 1 50:00 OT 18,71:DRAWTO 143,71:COLOR 3:

PLOT 0,79:H=(H+X)/2:I=(I+Y)/2:DRANTO H ,1 R2 PLOT 159.79:DRANTO H.I:IF (H)X-5 AN

170 COLOR 2:60SUB 50:1F 8(0.5 THEN 60S UB INT(RND(1)43)\$10+60 180 IF T(20 THEN 60TO 600 3 190 COLOR 4:60SUB 50:C=C+1:1F C=5 THEN

190 COLOR 4:60SUB 50:C=C+1:IF C=5 THE 60TO 110 200 60TO 130

300 TRAP 310:SDUND 0,99,8,8:SDUND 1,75 ,8,8:SDUND 2,60,8,8:SDUND 3,20,8,8 305 FOR L=1 TO 16:PDKE 712,15¢(RND(1)‡

17):MEXT L:RETURN
310 FOR L=8 TO 0 STEP -2:FOR L1=1 TO 8
:POKE 712,154(RMD1):17):MEXT L1
320 SOUND 0,99,8,L:SOUND 1,75,8,L:SOUN
D 2,80,8,L:SOUND 3,20,8,L:NETT L:POKE

712,0 330 IF 21=10 THEN RETURN 380 ? "DO YOU WISH TO RISK YOUR LIFE A SAIN?":POKE 764,255

390 IF PEEK(764)()255 THEN RUN 395 8010 390



E=10:X=20:Y=20:? * MILES TO TARGET=

40 FOR A=1 TO 25:PLOT RND(1)#87+38,RND (1)#18:NEXT A:80TO 110 50 PLOT X-5.Y:DRAWTO X+5.Y:PLOT X-2.Y+

11 DRAWTO X,Y-2: DRAWTO X-2,Y-1: RETURN 60 COLDR 2: PLOT 62, 32: DRAWTO 62, 48: PLO 147, 24: DRAWTO 47, 55: PLOT 17, 9: DRAWTO 17,70: COLOR 4: PLOT 12, 32: DRAWTO 62, 48 61 SOUND 1,90: 8; PLOT 47, 24: DRAWTO 47, 55: PLOT 17, 9: DRAWTO B, PLOT 17, 9: DRAWTO B, PLOT 47, 9: DRAWTO B, PLOT 47, PLOT 17, 9: DRAWTO B, PLOT 47, PLOT 18, PLOT 18, PLOT 18, PLOT 18, PLOT 19, PLOT 18, PLOT 19, PLOT 1

2 THEM IF E(Y+2 THEM 400 63 COLOR 4:PLOT 0,0:DRAWTO D,E:SOUND 1

,0,0,0:RETURM 70 COLOR 2:PLOT 96,32:DRAWTO 96,49:PLO T 113,24:DRAWTO 113,55:PLOT 145,9:DRAW TO 145,72:COLOR 4:PLOT 96,32:DRAWTO 96

,49 71 SOUND 1,60,8,8:PLOT 113,24:DRAWTO 1 D F(I+S AND 1)Y-2 AND 1(Y+2) THEM 400 83 COLOR 4)PLD 7,79 DRAWTO H,11PLD I 1 97,79 DRAWTO H,11SOUND 1,0,0,0 RETURN 110 COLOR 1)PLDI 2,0 DRAWTO 157,79;PLD I 0,0 DRAWTO 159,79;PLDI 157,0 DRAWTO 2,79;PLDI 159,0 DRAWTO 0,79

120 COLOR 3:PLOT 80,40:PLOT 79,39:PLOT 79,40:PLOT 80,39:C=0:SOUND 0,RND(1)#1 1+4.8.3

130 JS=STICK (0):IF JS=7 OR JS=6 OR JS= 5 TMEM L=1441F 19153 TMEM 8010 410 140 B=RND(0):RRIF JS=11 OR JS=10 OR JS= =7 TMEM IX-141F IX 5 TMEM 8010 430 150 IF JS=14 OR JS=6 OR JS=10 TMEM Y=Y -2:IF Y\(3\) TMEM ? OUT OF TRENCH! NIS STOM ARBORTES!**; SEND

160 T=T-0.5:POKE 656,0:POKE 657,23:? 1 MT(T);* ":IF JS=13 OR JS=9 OR JS=5 THE N Y=Y+2:IF Y>77 THEN GOTO 420 401 GOSUB 300:FOR U=4 TO 20:SOUND INT(
RND(1):44),RND(1):89,8,8
402 COLOR RND(1):88:PLOT X,Y:DRAWTO RND

402 DRAWTO X-U-RND(1)#3; 403 DRAWTO X-U-RND(1)#3, 403 DRAWTO X-U-RND(1)#3, 403 DRAWTO X-U-RND(1)#3, 404 DRAWTO X-U-RND(1)#3, 405 DRAWTO X-U-RND(1)#3, 407 DRAWTO X-U-RND(1)#3, 408 DRAWTO X-U-RND(1)#3, 409 DRAWTO X-U-RND

RAWTD X-U+RMD(1) #3, Y+U+RMD(1) #3: DRAWTO X+U+RMD(1) #3, Y+U+RMD(1) #3

404 POKE 712,U:MEXT U:60TD 310 410 60SUB 300:7 * HIT THE RIGHT MALL!! *:FOR U=150 TO 80 STEP -1:SOUND INT(RM D(1):44).RND(1):8.8

415 CDLOR RND(1) \$8:PLOT X,Y:DRAWTO X-R ND(1) \$45,10+RND(1) \$65:PDKE 712,U:NEXT U:80TO 310

420 GOSUB 300:? " RAM INTO THE TRENCH BOTTOM!!":FOR U=150 TO 80 STEP -1:SOUN D INT(RND(1):#4),RND(1):#4,8,8

425 COLOR RND(1) #8: PLOT X, Y: POKE 712, U

RELIVE THE CLIMACTIC

IDRANTO RND(1) #159, 40+RND(1) #39; NEXT U . OTTO 310

430 BOSUB 300:2 * HIT THE LEFT WALL!!* :FOR U=150 TO 80 STEP -1:SOUND INT (RND (1) \$4) .RND(1) \$U.8.8 435 COLOR RND(1) #8: PLOT X, Y: POKE 712,U

IDRANTO X+RND(1) \$45,10+RND(1) \$65: NEXT U-80TO 310 600 FOR J=1 TO 16: SOUND 2.30.12.4: POKE 670 IF JS=13 OR JS=9 OR JS=5 THEN Y=Y+

675 IF STRIG(0)=0 THEN 800 ARO IF JS=14 OR JS=A OR JS=10 THEN Y=Y

681 IF L=16 THEM ? " CLOSE ENDURH TO T ARRET! FIRE MON! . AR2 IF 1 328 THEN 2 * TOO LATE!! RAN IN

0 9: SOUND 1.60.12.4: POKE 84.2: POKE 85. 2:2 "PULL UP & OUT OF TRENCH!!" 860 SOUND 1.122.12.4:1F STICK(0)=13 TH FN SOUND 1.0.0.0:80T0 890 870 FOR U=1 TO 7:NEXT U

880 POKE 84,2: POKE 85,2:? "PULL UP & DUT DE TREMCHII" NEYT JUL = 30 GOTO AR? 890 FDR U=0 TO 79 STEP 41 BRAPHICS 231C OLOR 2:PLOT 0.U:DRAWTO 70.U/3+30:PLOT 159.U:DRAWTD 98.U/3+30:PLOT 17.87:DRAW TO 70.U/3+56

891 CDLOR 1:PLOT 72.43-U/3:DRAWTO 96.4 3-U/3:PLOT 84.31-U/3:DRAWTO 84.55-U/3: COLOR 2 895 IF U)46 THEN PLOT 0.U/3+23:DRANTO

159.11/3+23 900 PLOT 142,87: DRAWTO 98,U/3+56: PLOT

70.11/3+30+DRANTO 98.11/3+30+DRANTO 98.11 /3+56: DRAWTD 70, U/3+56: DRAWTD 70, U/3+3 910 NEXT USERAPHICS 7: POKE 712, 16: PLOT

0.79: DRAWTO 40.45: DRAWTO 80.40: DRAWTO 119,65 920 DRAWTO 159,79:PLDT 73,62:DRAWTO 79 .68: DRAWTO 81.79: PLOT 75.62: DRAWTO 81. 68: DRAWTO 84.79



GASING": SOUND 2,61,12,4:8=1:H=1 609 L=0:TRAP 401:REM REVERSE VIDEO LET

610 FOR U=1 TO 13: MEXT U: POKE 84.2: POK

E 85.1:? "ATTACK COMPUTER ENGAGING":N EIT J 620 GRAPHICS 7: POKE 712, 43: POKE 708, 0:

POKE 710, 2551? * ATTACK COMPUTER ACTI VATED !! "1POKE 709, 105 630 COLOR 1:PLOT 56,60: DRAWTO 105,60:D RAWTO 105, 25; PLOT 0, 43; DRAWTO 159, 43; P

LOT 84.0: DRAWTO 84.79 A40 COLOR 2:FOR U=56 TO 98 STEP 7:PLOT

U.56: DRAWTO U.59: MEXT U: FOR U=25 TO 5 9 STEP 6:PLOT 100, U: DRAWTO 104, U: NEXT

450 SOUND 2.RND(1) \$11+4,8,3:8=6+1:H=H+ 1:JS=STICK(0):IF JS=7 OR JS=5 OR JS=6 THEN X=X-1

AAO IF JS=11 OR JS=10 OR JS=9 THEN X=X

685 L=L+1:60SUB 690:Z=1:60SUB 690:80T0

430 690 COLOR 1:LOCATE 1.Y.U: IF U>O THEN C

OLOR 4 695 PLOT X, YS COLOR 35 IF Z THEN COLOR 4 :7=0

700 PLOT Y+6. Y+H: DRAWTO Y+6. Y-H: DRAWTO I-6. Y-H: DRAWTO I-6, Y+H: DRAWTO I+6, Y+H 710 PLOT 0.0: DRAWTO X-6, Y-H: PLOT 159,0 IDRANTO I+6.Y-HIPLOT 0.79IDRANTO I-6.Y +H:PLOT 159,79: DRAWTO 1+6,Y+H

720 RETURN 800 IF L(15 THEN ? * FIRED TOD SOON!!*

180TO 480 810 SOUND 1,80,8,8; COLOR 1:PLOT 27,79: DRANTO 84,43: DRANTO 137,79: IF X=84 AND Y=43 THEN 850

820 ? * MISSED!! THE UNIVERSE IS DODME D!!":60T0 310

850 ? " THE SHOT IS SOOD!!!":FOR J=1 T

E 84.2: POKE 85.1:? " AFT VIEW ANGE CRITICAL!!": SOUND 2,123,10,4 927 FOR J1=1 TO 16: MEXT J1: POKE 84.2:P

DKE 85.1:? * AFT VIEW RANGE CRI TICAL !! * POKE 709, 154 (RND(1) \$17) : NEXT U1 930 FOR He1 TO 99: POKE 709, 151 (RND(1)1

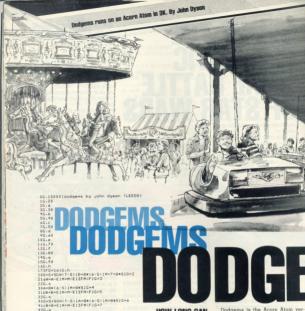
17): MEXT U: 60SUB 300: FOR U=170 TO BO S TEP -1:SOUND INT (RND(1) #4), RND(1) #U,8,

940 COLOR RND(1) \$8:PLOT RND(1) \$159,79: POKE 712.U: DRAWTO RND(1) \$159.RND(1) \$79 : NEXT U: 21=10: 80SUB 310

950 POKE 709, 15:2 * CONGRATULATIONS!! YOU'VE SAVED THE UNIVERSE!!!"; 960 ? " DO YOU WISH TO PLAY AGAIN?"11P DKE 764.255

970 IF PEEK (764) () 255 THEN RUN 980 BOTO 970

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11CB=8+E;N=N=E;IFN<F;G=7 42G-q 50B=8B-(8*(5-S));H=8+8*S;G=8 51dA=A+E;H=H-E;IFM<F;G=9

60S=S+SGN(T-S);8=88-(8±(5-S));M=8+8±S;G=10 61eA=A+E;H=H-E;IFH<F;G=11 62G-q 70a=104-(8±(5-S));M=8±S;G=12

70A=104-(8x(5-5));H=08x5;G=12 71;fB=0-E;H=M-E;IFM<F;G=13 72G.q 80S=S+SGN(T-S);A=104-(8x(5-S));H=8x5;G=14 81;B=0-E;H=M-E;IFM<F;G=15

918=8×(6-S); M=9+8×S; G=16 91hA=A-E; M=M-E; IFM<F; G=F 92G.a

YZL.q 100pPL0T13,X,Y;PL0T15,V,H 105IFX=#;IFY=B;G.20000 106IFV=#;IFH=B;G.20000 110V=X;W=Y;IFZ;Z=0;G.G 120IF?86002840=0;Z=F;R. 130MAIT;HAIT;G.G. HOW LONG CAN

.. YOU AVOID THE COMPUTER'S CAR.

HELL BENT ON

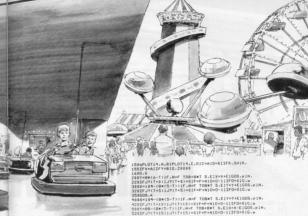
DEADLY COLLISION.

Dodgems is the Acorn Atom version of the "Head-on" collision game.

It's you against the computer, can you outwit it? You are driving a car around a circular series of tracks in an anti-clockwise direction

But who is that lunatic driving around the same track clockwise? An Americam? A lunatic with suicidal tendencies? No it's the computer who is out to get you, before you can clear the screen of dots.

The screen is divided up into a series of concentric circles with a number of crossover points which



MS

allow you to switch lanes to avoid the computer's car.

These lanes are filled with dots and he object of the game is to run over as many dots as possible before the inevitable crash. Every dot adds to your score at the end of the game. The computer can switch lanes as well and it will be trying to guess which one you will be in as the two of you cross over each circuit.

Your safest tactic is to wait until the computer has already committed itself before switching to that crucial lane — but don't leave it too late! 5007=80-(8x(5-T));F.N=F T08+8x1 5.E;X=7-E;U05-F;N.
520IFJ?(T+15);J?(T+15)=0;P=P+N;D=O-1;IFO=0;G.M
530COS.k
600Y=80-(8x(5-T));F.N=F T08+8x1 S.E;X=7-E;GOS.P;N.

600Y=80-(8x(5-T));F.N=F TOB+ENT S.E;Xxx-t;GUS.F;N 620IFJ?(T+20);J?(T+20)=0;P=P+N;O=O-1;IFO=0;G.H 720IFJ?(T+25);F.N=F TOB*T S.E;Y=Y-E;GOS.F;N. 720IFJ?(T+25);J?(T+25)=0;P=P+N;O=O-1;IFO=0;G.H

750GOS.k 800X=8x(6-T);F.N=F TOB*T S.E;Y=Y-E;GOS.p;N. 820IFJ?(T+30);J?(T+30)=0;P=P+N;0=0-1;IF0=0;G.w

900Y=8x(6-T);F.N=F T08+8xT S.E;X=X+E;GOS.p;N. 920IFJ?(T+35);J?(T+35)=0;F=P+N;0=0-1;IF0=0;G.w 950COS.k 1000C.200

2000kIF?#80018#40=0;IFT>F;T=T-F 2010IF?#8001<128;IFT<5;T=T+F 2050F.

10000-42;P=0;P=4;DIHL8,I64;\$L="G.11240";?16=L;?17=L&\$FFFF/256 11110P.\$12;DDP." "!U.C.-7;P."DODDEHS BY J.DYSON"/ 11111FF;P."YDUR SCORE MAS"(P-(43-0)*4)/8"/

11111IFFPP."YOUR SCORE WAS"(P-(43-0)*4)/8"/
1112IFP)1159P."HELL DONE TRY THEN"/E=E*Z!LINK*FFE3;G.11125
1113IFP=9;P."CTRL=IN SHIFT=0UT""(ONLY FUNCTION IN !---11114IFP=0;P."--"THE CENTRE OF GAP)!--- A --"""REPT=SPEED"'/
1111IFP=0;P."--""HE A,B,C"\$1;\$1*1="";IF\$1="A" E1;G.11125

11116IF\$I="B" E=2;G.11125 11117IF\$I="C"E=4;G.11125

11120G.11115 11125CLEAR3;COLDUR2;F.N=12T048 S.8

11130MOVE(48-N),(48-N) 11140PLOT1,N,0;PLOT0,16,0;PLOT1,N,0

11158PL011,0,1N-03/PL010,0,0/PL011,0,0,(N-8)
11158PL011,0,N-03/PL010,-16,0/PL011,0,(N-8)
11168PL011,-N,0;FL010,-16,0/PL011,0,0,0
11179PL011,0,0-N);FL010,0,-16;FL011,0,(8-N)
11180N.;H0VE44,44;FL011,24,0;FL011,0,48;FL011,-24,0;PL011,0,-8

11188N.; MOVE44,44; PLO11; T. 34; PLO11; 3.6; N.; PLO18; 6.0; F. 8-6TOS 1120#NOVE9,8; F. A-8TOS; F. B-6TOS; PLO79; 8,0; N.; PLO18; 6.0; F. 8-6TOS 11218PLO79; 8.0; N.; PLO18; -104,8; N. 1122#NOVED; 7.56; F. 4-8TOS; F. B-6TOS; PLO17; 8.0; N.; FLOT8.8.0; F. B-6TOS

11238FL0T9,8,81N.;FL0T8,-104,81N. 11248X-56;Y48;U=X;M=Y;I=5;G=1;S=5;A=55;C=-1;F=1;F.R=1T01 11258M-56,Z2;C0CUMB;IF=0;D=T.+9;F.J=0T048;O?J=1;N.;J=T.+9;O=48

1130G.200 20000F.A=0T0400;?#880Z=A;N.;N.R;;G.11110 20010wN.R;G.11110

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A traditional favourite given a nice touch with good graphics

a transman rayourne given a note timen with mouse? and music. Can you save the victim from the noose? on a Sharp MZ-80K, By Stephen



That old perennial wordguessing game Hangman is given a new lease of life on the Sharp MZ-80K by 13-year-

old Stephen Davidson of Aherdeen Using graphics and the Sharp's musical capabilities, Stephen has produced a simple program that will help while away the evening hours and will challenge and amuse your friends.

If you have a photographic memory you might have to ask a friend to program in the DATA statement words. Although there are enough there to still keep you guessing.

For those of you who have

MUSICAL MUSICAL MUSICAL MUSICAL

100 REM	
110 REM	Hong man
130 REM	
140 REM	l by
150 REM	STEUEN DAVIDSON
160 REM	STEVEN DHOIDSON
180 REM	
190 TEM	4:DIMMC\$(25)
200 609	490: GOSUB580: GOSUB450: GOSUB870
210 FOR	1TOINT(50*RND(1)+1):READ R\$:NEXT =1 TO LEN(R\$):POKE 53554+1,42:NEXT
230 AT=	1 10 LEN(R#)-FORE 33334-1342-NEST
	s: IFAs=""THEN240
250 IF	C(A\$)<65)+(ASC(A\$)>90)THEN230
	1T020: IFA\$=MC\$(I)THEN230
270 NE	=1TOLEN(R\$):IFA\$=MID\$(R\$,K,1)THEN GOSUB470:IFSU=11THEN940
290 FUN	IFAT=1THENMUSIC"=C1"D"E":GOTO230
300 MH	n D2n
	+1:MC\$(MC)=A\$:POKE53832+(MC-1)*2,ASC(A\$)-64:IFMC=7GOSUB350:END
320 G09	330:GOTO230 +7:LL\$=LEFT\$(LI\$,YK):PRINTLL\$;TAB\$;H\$:POKE4514,10*YK:USR(68)
330 YK	=1T0100:NEXT:USR(71):RETURN
350 VK:	: \$=LFFT\$(LI\$, VK):PRINTLL\$; TAB\$; H\$
360 PRI	"BESSESSESSESSESSESSESSESS"; TAB(10); " ": PRINTLL\$; TAB\$; H\$
370 PR	LL\$; "B"; TAB\$; H\$: FORI=1T010: POKE4514, 10*I: USR(68): NEXT: USR(71)
380 PR	LL\$;"B";TAB\$;SN\$:PRINT"BBBBBB";TAB(23);" The word was: " "B";TAB(27);R\$:FORDL=1T01000:NEXT:GOSUB1190:RETURN
400 FOR	=8TO14:LL\$=LEFT\$(LI\$,YK):PRINTLL\$:TAB\$;H\$:POKE4514,10*YK:USR(68)
410 FOR	=1T0100:NEXT:NEXTYK
420 USF	1):PRINT"G888888888888888888888888888888888888
430 PR	LL\$;"2";TAB\$;H\$:FORI=1T010:POKE4514,10*I:USR(68):NEXT:USR(71)

440 PRINTLL\$; "B"; TAB\$; SN\$: GOTO1190 450 PRINT"BESS";:FORX=1T020:PRINTTAB(18);" never played Hanaman, it is a test of your vocabulary and knowledge of word structure. You are presented with a series of empty spaces, which represent a word the computer has committed to memory.

The computer then invites you to guess one letter which might be included in the word. If the letter is there somewhere then it appears in the correct place on the

screen. If it does not feature in this word then the first struts of a gallows are drawn on the

screen and the poor devil who is about to be hung appeals for aid.

Another letter and you should have some clues about the word's construction. For example: a "G" as the penultimate letter suggests the "H" would be a good guess for

that final place. If you guess the word before the victim is hung you notch up a victory. If not then you have his death on your conscience. Stephen's victim makes very passionate ap-

peals for your aid. One helpful hint is that "E" followed by "T" are the most common letters in the English



790 PRINT"

800 PRINT" 810 PRINT"

31

```
alphabet.
460 PRINT"BESSESSESSESSESS:;:FORX=1T08:PRINTTAB(18);"
                                                                                                                                                       ": NEXT: RETURN
470 POKE53554+K, ASC(A$)-64: AT=1: SUB=SUB+1: IFSUB=LEN(R$) THENSU=11
480 MC$(20-SUB)=A$:RETURN
                      | Canan 41 9222 | Decana V 222224111 | Canan 11 | Canan 11 |
490 H$="
TARS="EDECEDERED
510
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 OH NO !"
550 HJ$="E88899888888888888888 83 83 8 T 8 83 83
SEG PRINT"ERS":
600 PRINT"N
                                Æ
610 PRINT"M
620 PRINT"N
                                                                          =Hansman=
630 PRINT"BLAF
640 PRINT"
                                                                       Help! I am about
650 PRINT"B
                                                    43.
                                                                        to be killed for
 660 PRINT"N
                                                    CHEC
                                                                        a crime I did not
670 PRINT"
                                                                        connit! (as usual!)"
 680 PRINT"N
                                                   4110
                                                                        Only you can save
                                                                        me by suessins the "
 690 PRINT"B
                                                 E 1/3/3/3 E
  700 PRINT"M
                                                  110001
                                                                        the right word
                                                                        before I am lowered"
  710 PRINT"M
                                                    1.1
   20 PRINT"
                                                                        into a vat of shark"
                                                      11
                                                                        infested custard!! "
    30 PRINT"N
                                                    13 13
  740 PRINT"B
  750 PRINT"8
                                                                10 A
                                                                            Will you help ?
  760 PRINT"M
                                             M NASTY M
                                                                                 (Y OR N)
  770 PRINT"
  789 PRINT"B
                                             # STUFF #
```

HANGMAN SHARP

SAVE AN INNOCENT MAN

```
820 MUSIC "CIDERIEDCTCTDTERITETDTCCDERIEDCTCZTDZTE2RZTEZTDZTC6"
830 GETAS: IFAS=""THENSIG
849 IFD#="V"THENRETURN
OSO TED$="N"THEN400
860 G0T0830
870 PRINT"DECESS";
880 PRINTTAB(22);" ? What letter ?"
890 PRINTTAB(23); "$888888
900 PRINTTAB(23);"| | | | | | | | |
910 PRINTTAB(23):
920 PRINTTAB(22); "BBBB These are wrong!"
930 RETURN
940 EOPDI =1TO1000:NEXT
950 PRINT "E H H H H H H H H H H H H H H H
960 PRINT" THE HEHERE HE
                HOF BY BUILD HO
970 PRINT"
            .
980 PRINT"
                13 13
990 PRINT"
             .
                        1991 1991 11 11
1999 PRINT: MUSIC "D1#D1E1TC2E1TC2E1TC6TC1TC1TD1T#D1TE1TC1TD1TE1TE1B1TD1TC6"
                Wow! I don't believe it!
1020 PRINT"
                You saved my life!
1030 PRINT"
                      888
1040 PRINT"
1050 PRINT"
                     1 43, 1
                             They are soins to"
1060 PRINT"
                     I DED I
                           hang me again!"
1070 PRINT"
                      120/
1080 PRINT"
                      1991
1090 PRINT"
                      1131311
                           Please save me!"
1100 PRINT"
                      1333
1110 PRINT"
                       . .
1120 PRINT"
                       11
1130 PRINT"
                       1 1
                      N N":FOR.I=1TO5:PRINTHJ$;HK$;HL$;HI$:NEXT
1140 PRINT"
1160 GETA$: IFA$=""THEN1160
 1170 IFA$="N"THENPRINT"E":END
1180 RUN
1190 GOSUB 450: PRINT "DESERBEREES"
 1200 PRINT TAB(24);"
 1210 PRINT TAB(24);"
                       P
 1220 PRINT TAB(24); "
 1230 PRINT TAB(24); " L__ I
 1240 PRINT TAB(24);" | P |
 1250 PRINT TAB(24);"
 1260 PRINT TAB(24);"
 1270 PRINT
            TAB(24);"
 1280 PRINT
            TAB(24);" ["]"
 1290 PRINT
 1300 MUSIC"C6R2C4R1C4R1C6R1#D4R1D4R1D4R1C4R1C4_B4R1C6"
                             Try Asain ?2": G0T01160
 1310 PRINT"B
  320 DATA "SHARP", "DESPAIR", "HELP", "MILD", "ANGEL"
 1330 DATA "HOPE", "PEACE", "MOTHER", "GIVE", "LIFE"
 1340 DATA "FLOWER", "EARTH", "SUN", "STAR", "FIELD"
 1350 DATA "KNIGHT", "WORK", "WORLD", "SPEED", "BASIC"
 1360 DATA "PLAY", "PEOPLE", "COUNTRY", "POUERTY", "SHIP"
 1370 DATA "WELCOME", "ANT", "CAT", "DOG", "BOX"
 1380 DATA "DESK", "CHAIR", "SUMMER", "SPELL", "COOL"
 1390 DATA "HEAD", "RADIO", "APPLE", "ORANGE", "STEREO"
1400 DATA "BASE", "EAR", "LIGHTER", "BOOK", "MONEY"
 1410 DATA "HELLO", "TELEPHONE", "RHYTHMS", "CHANGE", "SPECIAL"
```

GAME OF THE YEAR

A MAGAZINE IN NEED

Only with your help can we continue to make Computer & Video Games a worthwhile purchase.

Our continued existence as a magazine depends on you, the readers, deluging us with games program listings which you have invented for your own microcomputer.

We are willing to pay £10 for each games listing we publish and for those listings we are particularly keen on there is a further financial incentive.

We will professionally market the best games that appear in our magazine through high street chain stores and if your game proves a winner it could mean a flood of royalties coming your way.

Your way.

Those are just the start of the temptations we are offering you to become a Computer & Video

Games contributor. Please check your programs carefully before you send them into us. I know the temptation is to look at our creations through gold-tinted spectacles, but, just before you run it off on the printer, check to see that if the biggest moron going tried to so when it gets to the office) be could do so without crashing it.

Another please now: Please do not send us programs that you have copied from professional tapes or spotted in other publications, these may be spotted by our eagle eyes or they may slip through and cause untold problems.

We will look more favourably on games which show an original touch and have a new approach to away the same and the same a

If possible could you include a

cassette of the game so that we, or one of our review team, can try it out and give us a rundown on just how good it is.

Each month we will be picking out a couple of programs and giving a run down on how they were put together. What the variables are doing and how the programmer has overcome certrain problems with an idea that other readers could adopt to their machines.

So if you could also enclose with your listing, a brief rundown of how to play the game; whether it can be played by one, two or more people.

A brief synopsis of what the

PROGRAM YOUR WAY TO PARIS

You could be in a position to treat a friend to a weekend in Paris — complete with spending money — next year.

That is the prize for the best games program listing sent in to us in the first 12 months of this magazine's life.

magazine s inte.

Paris may not be the games capital of the world but it does have its attractions and, when you are spending our money, I'm sure it will be all too easy to turn what could have been "just another weekend", into the weekend of a lifetime.

Come next October a panel of judges will sit down to play all the

best games that have been sent into us. They will take into account the originality of the game, the use of the facilities that particular computer had to offer playability, programming provides and presentation.

After some sun searching and, doubtless, a lew arguments, the winner will be announced in our November 1982 issue.

So if you send in a games listing try and keep a friend in mind. The competition is opin/10 everyone barring myself and the judges whose word will be heal.

There is also the prestige of having your name and, if suitably photogenic, your acture spread all over the magazine as a top game writer. When knows where that could least

game is about will also be of benefit. And finally we would like to have a list of what the variables or certain subroutines are doing; which part of the program makes the trees grow; or how you shot all the deserting space invaders and made them fall on the poor defender instead.

Computer & Video Games is

computer a view dames is an opportunity for the nameless thousands who have been alone with a microcomputer for too long. So whether you have written a massive adventure in 48t for your Apple, or a 1K but aloud the sound of the sound with the sound of the sound of

I'm sure there must be plenty of easier ways to earn a termer but are there any as re-warding?



HAS anyone played Space Invaders with the sound turned off? The game immediately loses an enormous amount of its appeal. Even the familiar "Plonk", "Plonk", of the ball bouncing backwards and forwards goes a long way to step a game of video tennis becoming a total bore immediately it is turned on.

The reason for this is not hard to explain, a fourth exciting dimension, sound, has been added to these games which we find both stimulating and satisfying. Equally exciting is listening to a favourite piece of music being played in four-part harmony by your own computer, especially if you entered it yourself straight from a manuscript.

This page will deal exclusively with this fourth dimension. I intend to describe practical circuits which will enable you to add simple sound to your own programs, make good use of any inbuilt sound facilities, control external sound sources and also take advantage of the excellent commercial music programs which are becoming available. I will also mention any good books or articles on the subject which I come across. Of necessity, several of these packages will be dedicated to one make of computer but I will try and keep as wide a spectrum as possible.

THE SPOKEN WORDS

A computer can control all kinds of external sound generators. It can cause a siren to sound or a starting-gun to fire. It can easily be made to modify sounds already being generated by some other electronic device. e.g. change its volume, add vibratio or change pitch.

Some electronic organs and synthesisers now being marketed have facilities built in which allow them to be directly interfaced to a computer.

There is also a new generation of dedicated sound making chips such as the AY-3-8910 which have been expressly designed to



BY DAVID ANNAL

be controlled by computer. These chips contain several generating circuits which produce both musical tones and noise.

In-built registers on the chip ore filled with control instructions by the computer which can then forget about sound and perform some other task. leaving the sound chip to get on with making noise. Sounds from three-part music to terrifying explosions can be produced.

Exciting new forms of this type of circuit are now appearing on the scene, they are the speech synthesizers. Individual words synthesizers, Individual words are the speech synthesizers, Individual words nearly in memory chips (R.O.M.) mounted on an external speech board. The words are "spoken" under control of the computer and whole sentences can be extracted to the computer of the computer of the computer of the computer and whole sentences can be settle. Method is to have only phonetic parts of speech available which can then be strung the strung the control of the computer of the control of t

together by the computer to make an infinite number of

WIRED FOR SOUND

Several micros are now being made which have sound generating circuits built in. Some of these are quite sophisticated and can generate complicated sounds and music. Others are intended only as warning bleeps to signify "end of line" or "error". If no direct facilities are provided, it is still possible to generate even quite complicated noises and output them to a small amplifier via one of the ports. Indeed, even a direct connection may be unnecessary. sound from the computer being nicked up by a small radio placed nearbyl Computers work at high frequencies and some of this energy is radiated.

How a computer can actually make sounds itself is something which I will discuss in future articles. Here I will just say that signals can be produced which come out of one wire "endways".

in a serial form.

for a title?

Alternatively, signals can come out 'sideways', or in parallel form, using eight wires all at once. These eight wires correspond to the eight bits of the computer date output port. If his particular that is a constant of the computer of t

Anyone near the International Pet User Group stand when the Pet pantologist Jim Butterfield was there, would have heard a new program which he brought over from Canada (not yet available commercially). Full fourpart music was demonstrated together with attack, sustain and decay, all computer controlled. In addition the word "Commodore" could be "sung" to a scale played on the keyboard. I wonder when we'll hear the first opera written and performed by computer..., any suggestions

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SOFTWARE includes Asteroids, Alderbaran, Election 1984, Towering Inferno, Escape from Colditz etc., etc., new games

introduced every month.

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when he first starts to use his Genie.

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15770 bytes of user programmable memory, upper and lower
case and graphics display, built in tape recorder and GWERTY
keyboard, with sound kit and joystick sockets installed and two

There is a user manual and a BASIC manual, and a programming for beginners book.

ming for deginners book.

There are three cassettes with demonstration programs and games and useful routines including a STARTREK type game. SURROUND, CHECKOUT, HANGMAN, WORDFIND, FRUIT, MAGIC CARPET, a name and address list program and pre-school letter recognition game. Four other games tapes will

There are three blank computer quality cassettes for your own

use.

There is also a head cleaning tape with a demagnetising action for the tape recorder.

action for the tape recorder.

There are four coloured folders for the manuals or for screen overlays.

The television is not included.

There is a one year's guarantee on parts and labour.

This package is available on ten day delivery, send your cheque for £395 with your order.

This machine is fully expandable NOW, a printer and/or Aculab may be connected to the consolis, or an expansion interface may be connected, which includes data and printer interface can take a hope election of boards to cover most hardware needs, and this includes the ability to un other interface can take a hope election of boards to cover most hardware needs, and this includes the ability to un other of pool quality software for all renal computer applications including word processing, accounts, stock control, engineering largest geat from BASIC, compliers and assemblers to a guages geat from BASIC, compliers and assemblers to

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Circle No. 133

The Space Monster is a horrend ous scarlet blob complete with sprawling tentacles. It lurks behind an army of 10 robots flinging deadly missiles groundwards.

When it senses victory over the around forces (you) it rushes earthwards to finish them off and the whole thing can be a very nasty experience - especially if you have a phobia about spiders. A Philips G7000 spin-off from the Space Invaders craze, Space

Monsters does not have rows of advancing horrors, just the monster and his 10 robots, each of which is equipped with a cannon and a shield to hide behind Your ground forces consist of

a large- and easily-hit tank, with three reserves and three shields. Each time the monster or his robots score a hit you appear on the screen as a vulnerable little figure which has to dash behind a shield and press the button to put yourself into a new tank. Any hits on you while tankless give an instant win to the monster.

With each new tank for which you press, one of your remaining shields disappears. This makes the opening period of each new wall critical, for if you lose some shields before creating a breach in the robot's line, your large tanks are easy to hit.

The robots and their cannons are vulnerable only for a split second while their shields move to one side for them to fire. Around £15 from your local

G7000 dealer



The TV game of Tennis has come a long way since that first simple paddle-and-ball version appeared in the darkest corner of your local and then re-materialised in

the living room. The latest Tennis games capture much more of the atmos nhere of Wimbledon and that sport played by the Bjorn Borgs of this world.

One such cartridge, produced by the U.S. firm of Activision for use with the Atari Video compu-

ter system, offers a skilful challenge which compares favourably with the Atari Basketball game. Two small figures whack a ball

around a three-D simplification of a tennis court, rackets swinging whenever they are within arm's reach of the ball, in an attempt to out-manoeuvre one another. You cannot hit the ball out of play or into the net but it is possible to misjudge the bounce which is gauged by following the shadow of the ball along the court. It is all too common to find yourself set an impossible chase across the court after a sharply-angled shot from a superior opponent.

The skill to acquire is leaving the ball until the last moment to hit it at an acute angle.

WIMBLEDON WITHOUT TANTRUMS

Using this technique it is possible to reproduce much of the excitement of the real thing, including ace serves, serve-andvolley play, baseline duels and

'running around" a shot to out it into the opposite corner. Another recent launch from Activision is Boxing. This gives a view from above a boxing ring as

two competitors slug it out. Points are scored in ones and twos for hits to the opponent's head. Each hit, rocks him back and the best tactic is to trap him against the ropes and score as many points as possible before he fights his way clear again.

The defensive boxer will find few places to hide in this ring and sheer aggression, combined with feverish button pummelling, usually wins the day. Knockouts occur when a fighter scores 100 points, otherwise it is two minutes of frantic action.

Only' two versions here, against either a human or a computer opponent, but the computer often takes a beating.

These two cartridges are the first written by Activision for the Atari and are being distributed here by Computer Games at a cost of £16.95 each. More are due

ALIENS IN YOUR SIGHTS

Space themes are still eve catchers in the video games world - even though Space Invaders enjoyed its heyday in 1979 Each TV games centre manufacturer makes sure he has a few alien titles in his range,

Snace Battle is one of the latest of these offerings, running on the Database video unit. It has a"Star Wars" theme to it with the player looking through the cockpit of his spaceship as a fleet of fast-flying alien spaceships approaches.

As the attackers home-in on you, the skill is to dodge their fire while replying with your own lasers when an alien ship is within your sights.

Points are scored for each one destroyed, with three for a Starship; an Alien nets you five and seven for a Spacefighter. Only three lives are granted.



Also out now is a golf cart ridge, played on an 18-hole course and offering players a choice of club for each shot. Among the hazards to avoid are rough, bunkers and trees. To increase the difficulty of the game further you can change the wind speeds and directions.

Database cartridges are somewhat cheaper than the rest of the market brands and Golf and Space Battle are £13 each.

PHILIPS 25

It is back to the Middle Anes and siege warfare in Stone Sling. Just to prove that technology can take you back into the past as well as the future - and still satisfy all those destructive

With Stone Sling you could soon rival Oliver Cramwell in the number of castles you batter down. The scenario is extremely simple - two knights, each with a catapult, slinging rocks over their own castle and a take in an effort to reduce their opponents

castle to a pile of rubble. Tactics can be varied either by disabling your opponent's catagult or smiting him with a well-aimed rock. Both of these retire for a few seconds while you get in some ranging shots on the castle

This cartridge is one of the latest batch from Philips for its G7000 video unit. Among the other new Videopacs on the market are Laser War and Catch the Ball. All Philips cartridges have a recommended retail price

FOR PINBALL **WIZARDS**

You can steal a march on the pin-ball wizards by practicing at home on Super Knockout. This version of the old

amusement arcade favourite game runs on the Acetronic MPU 1000 entertainment centre. This TV test of quick reactions and co-ordination is complete with flippers, bouncing balls and flashing lights - and you can not tilt!

Shooting gallery takes you back to the fairground - except that there is no goldfish to be won when you achieve a high score. It incorporates 32 versions of the aim-and-fire game to test your eye and timing.

These two games are not so imaginative as some of those already in the Acetronic range. The Acetronic cartridges retail at £14.95 each.

ASTEROIDS

Vaporising ever-larger clusters of meteors before they belt your snaceship are the ingredients which turned Asteroids into a

classic oub and arcade game. It has survived the conversion to the living room, remaining just as addictive and offering a good deal more colour and

Both the original Asteroids arcade game with the hyperspace button and the more recent Asternids de Luxe with the shields innovation, are to be found among the 66 versions of the game on the Atari cartridge.

The action centres on a small arrow-head-shaped spacecraft. controlled by you. This can be rotated in either direction, it can push of the button and - for the more advanced - thrust off in the direction you are heading.

This ability takes some controlling, for although you start slowly it is possible to whizz across the screen faster than any asteroid factics cause the opposition to with a very good chance of crashing. There is also the worry that unless you get back to the centre of the screen before the last asteroid is destroyed you will find an asteroid materialising on

> There are also three special features - hyperspace, shields and flin. Hyperspace is a classic panic button. When destruction seems inevitable nush the lowstick back and you disappear off the screen, only to re-appear split seconds later elsewhere. There is no guarantee that you

too of you.

asteroid, though, and that split second it takes you to reorientate yourself may also be your last.

Shields last for only two sec onds. They enable you to pass through the asteroids but if you out them down too soon it is fatal — and the same applies when you keep them on for more than two seconds.

Flin gives the ability to turn 180 degrees instantly and fire at any asternids trying to speak up

One difficulty switch "A" alien satellites add to your problems by flying across the screen firing at you. A large blue one of these emerges early without appearing very adept at either dodging asteroids or firing accurately. His little green brother which appears more frequently in the later stages of the game is far more accurate.

The asternids solit in half when hit with those half-size pieces of rock splitting again upon another hit. These small boulders are destroyed on the next successful shot but being faster and more difficult to hit are worth more points.

Arrade Asternids machine players will have to learn to use the joystick instead of pressing buttons and may need to re-think their tactics but otherwise this is very close to the game they already love. Whether they can afford the £34.50, which makes Asteroids one of the more expensive cartridges for the Atari Video Computer system, is



CLOSE **FNCOUNTERS** OF A **HAZARDOUS** KIND

Take command of a space ship on a dangerous mission into the uncharted depths of space filled with hazardous encounters.

In Astrosmash, new from ACE for the Mattel Intellivision 3D home video unit, you control the command space ship on a mission into outer space, navigating through meteor showers. The safety of the ship depends on your expertly-aimed laser fire. If you miss the falling stars and they get you instead it's too late. - you're dead



Only three lives are yours to play with, on the way to tottingup your score, which is boosted by the number of meteorites destroyed.

The beauty of Intellivision is the high standard of the graphics and realistic effect of a threedimensional picture. The whole game is given a visual depth which ordinary video units cannot equal. Instead of the stilted movements which are an evesore on so many games. Intellivision graphics flow when they move, making them much more

Intellivision really comes into its own on the sports games in which the players look more like real humans. You can see their leg joints move and flow as if they really are running

The latest game in the range titled Major League Sports Network, is Bowling, which is out this month. The game incorporates standard bowling rules with a bowling alley and skittles on the screen, all in perspective. You operate the bowler using

the hand controllers to get the angle of the shot correct. The

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keyboard control of the Laser Base & Laser Bolt firing using () & () and the

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BY ALEX GATES

PLAYING Adventure on a maincrack taking months and months to solve But that doesn't stop people sneaking into the compu-

Most large makes of computers can run a variety of games but Adventure is the most popular and best suited. It is much more of a test than a micro based game because of the massive storage capacity mainframes have, extending the vocabulary

Many more details of scenery are available than on a micro and there are far more places to get lost in more treasure to find. more dangerspots and hazards

The principle of the game is the same as any adventure game. You have to find a certain are dotted about an area littered with dangerous objects and evil beings.

Not only do you have to find the treasure but there is also a points system clocking up your score You get 10 points for finding a piece of treasure, 10 points for getting it safely back to the store room, one point for each room you manage to enter but you lose 10 points if a piece of treasure is stolen by pirates. dwarfs or trolls, who are all out

Usually the top score is about the 350 mark: obviously you must try not to give gway any points while you're on the treasure

When you get down to a serious game of Adventure, it is best to keep a record of where you have been in map form.

The sooner you find out the boundaries of the area in which for it by gathering information and clues. Be brave and try going in every direction possible and in to every building (whether it's a safe looking barn, an evil smelling dungeon or a

What it boils down to is that the game can only successfully he played by trial and error, frustrating though it may be.

A noteworthy tip in case you foolishly set foot in the labyrinths of underground mazes is to leave behind some of the least valuable clobber you are carrying. By leaving a marker behind you'll save a lot of time aimlessly walking through corridors and tunnels which look exactly alike.

If you leave a pointer, say some food (which always



your water bottle or a couple of coins (providing your lamp isn't going dim in which case you will need them to put in the vending machine for new batteries), you can quickly establish a map of the maze and get vourself out safely.

Console vourself with the knowledge that the computer is not always as tight-lipped as you may at first think. For instance it gives away some clues, subtle as they are, but your knowledge of classic fairy tales comes in handy.

To find any piece of treasure you have to follow each step in the correct sequence. You'll be hitting your head against a wall if you get to a stage when you know you should be able to use the tantalizingly near object to lacking a vital item. An obvious example is the bird chirping happily in the sky. You know you need it for something but forgot to pick up the cage to catch the flighty creature in at the previous step.

Before during and after you experience a close encounter of the kind you would rather not have, with trolls, dwarfs, wizards and elves, you are bound to have the opportunity of picking up a variety of objects. Some of these are worth having, the lamp, money and weapons are good just put there to lead you astray. It's up to you to decide which you are going to need.

And unfortunately it's only your good judgement and luck which will reveal the three or four magic words which are vital for finding the treasure. Often you just stumble against them. and sometimes you're given a clue in the form of a riddle which you have to puzzle out.

There are going to be times when you will want to beat up the computer yet the only way to vent your anger and frustration is to swear at the machine. It only makes you feel even worse. It will either answer you back with whatever expletive you used, or it will chastise you with: "tut, tut. Mind your language, please".

At the end of the game, either when you have found all the booty or been killed or committed suicide (ves. even that's possible if you can't take the strain), the print out will give you an assessment of how well you fared, along with your points

It's just as well there are no hard and fast rules to stick to. If there were it would be far too easy and the fun would be taken

And once you have been whisked away by a crowd of laughing elves into the sunset having found all the treasure there is little left to hold your attention.

While it is not difficult to learn enough Basic in a short time to be able to write short, simple programs, the language was not intended to be used for large, complicated programs.

In fact, it was designed before modern structured programming techniques had been formulated. As most of us are stuck with Basic on our home computers we have little choice but to write our large programs in this language.

My aim in this series is to present algorithms and programming methods which make it easier to write programs which work proporly Where routines are given in Rasic they will be written with a minimal subset which should be easy to understand but is not intended to follow the syntax



required for any specific machine. All questions, seemingly unsolvable programming problems, and suggestions for topics to be covered will be welcomed. This series is intended to help you program efficiently and the content of future articles will be governed largely by the comments and ideas received.

quence appears every time the

machine is switched on it is

often necessary genuinely to randomise the starting value.

Some Basics make a provision

for this - for example, RAND on

the ZX-81 and RND(-TI) on the

PET - which initialise the ran-

dom number seed from the

the TV but on some machines the programmer must insert his own routine to ensure a true random start for the RND function.

A games program will usually begin by printing instructions and waiting for a response from the player before starting the game. This is a convenient point to insert the randomising, and a simple way to do it is:

100 PRINT "PRESS ANY KEY WHEN BEADY"

120 LET X = RND 130 IF AS = " " THEN 110

When the program continues the next value used from the random number sequence will depend on how long the player waited before pressing a key.

That however, is not very satisfactory for two reasons: first Basic is rather slow and normal variations in the speed of pressing a key may produce only three or four starting points; and second someone sitting with his finger on a key while the instructions are being printed will defeat the object of the routine.

The second objection can be overcome in Basic, by adding an extra test at the beginning of the routine, but to ensure a wide range of starting values for RND

A WILD CARD

Most games programs use random numbers, so it is important to know something about how random number functions work, what their limitations are, and how to use them efficiently. The RND function in Basic gives pseudo-random numbers, calculated by a procedure which is designed to produce a sequence with no easily-detectable relationship between successive numbers, and with the numbers spread evenly over their range.

The method used on the ZX-81 and described in the manual is typical of the pseudo-random number generators used in microcomputers. The ZX-81 keeps a number between 1 and 65535 as a seed for the random number and a random number is produced by first calculating a new value for the seed as 75* (seed + 1)-1 (taking the remainder after division by 65537 if the result exceeds 65536) and then returning the new seed divided by 65536 to give a number between 0 and 1.

Those pseudo-random numbers are good enough for most purposes but as the same senumber of frames displayed on UNTIL CASE i OF proc 1... proc n a machine code subroutine is

Another problem arises with random numbers when you need all the numbers to be different. Shuffling a deck of cards can be regarded as a problem of this kind, requiring a routine to generate a list containing the numbers 1 to 52 in random order.

bers i 10 52 in random otder. When only of sew numbers are needed it is simple enough test each number as it is generated and discard those which have already been used. With a longer list required this proceed of the control of th

A simple way to perform a shuffle is first to fill an array with the numbers in order and then work through the array, exchanging each element with a randomly-chosen element. A simple routine to do this is:

10 DIM A(52) 100 FOR I = 1 TO 52

100 FOR I = 1 T 110 LET A(I) = I 120 NEXT I

130 FOR I = 1 to 52

140 LET R = 1 + 52*INT(RND) 150 LET X = A(I)

160 LET A(I) = A(R) 170 LET A(R) = X

180 NEXT I

STAY IN CONTROL

Structured programming is a method of program design which, used properly, produces programs which are reliable, easy to maintain, and easy to read. A fundamental principle of structured programming is that a program should be constructed from modules with a single entry point and a single exit point. Any program can be written by

refining the modules successively to include more and more detail using only three control structures: SEQUENCE. IF THEN. ELSE. .. and DO... WHILE ... Two additional control structures, DO... UNTIL and CASE, are useful in practice but are not theoretically necessary. Flowcharts for these control structures are not available in Figure one.

An important property of structured programs is that program flow goes straight on from top to bottom and never jumps about the way Basic programs do when

GOTO is used indiscriminately. There are many reasons why structured programming is impossible in Basic but programming in Basic cut programming in Basic cut programming in Basic can be made easier by using structured methods as much as possible. Although most of the fundamental control structures are not available in Basic it is possible to obtain the same effect using the language.

SEQUENCE is no problem, as it is just a matter of one block of statements following another, and CASE corresponds to the Basic statement ON variable GOSUB line no. line no...

DO ... WHILE ... and DO ...
UNTIL can be implemented in
Basic with IF ... Then ... and
GOTO. The example shows DO
... WHILE ...; DO ... UNTIL ...
is similar, but the test should be

made after the DO procedure instead of before.

99 REM WHILE 100 IF condition THEN 120

110 GOTO 200 119 REM DO ROUTINE STARTS HERE 120 ...

189 REM DO ROUTINE ENDS

190 GOTO 100 199 REM START OF NEXT BLOCK 200 ...

A few microcomputer Banics—including TRS-80 Level II—allow IF ... THEN ... ELSE ... but where it is not available it can be implemented by using ON variable GOSUB line no, line no. The variable must first be set to a value of 1 or 2 depending on the result of the IF test. The straightforward way to do this is:

100 IF condition THEN 130

109 REM ELSE 110 LET X = 2

120 GOTO 140 129 REM THEN 130 LET X = 1

140 ON X GOSUB line no, line

Another method is to use the feature of some Basics which allows the truth value of a conditional expression to be assigned to a variable, for example:

100 LET X = (A < B) or 100 LET X = (A = B)

The numerical values used to represent "true" and "false" vary from machine to machine, the most common being -1 and 0 or 0 and 1. If true is represented by -1 and false by 0 we can get IF ... THEN ... ELSE by:

100 LET X = condition 110 ON X+2 GOSUB line no.

> Before you use this method you should, of course, check that your Basic allows

your Basic allows assignment of truth values and find out what values are used.







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Routines and programs are scattered liberally throughout the text and the final chapter consists of beelve useful, interesting and entertaining programs such as LINE RENUMBER, BOUNCER, SHOOT, 51ATISTICS etc.

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BY KEITH CAMBELL

ADVENTURE is arguably the most popular game so far adopted by the computing fracturally. It was a superstanding the supe

It is a game which generates fervent enhusiants. I was staying overnight at Brighton on a
business trip and, to pass the
evening, walked along the secfront, finding myself eventually in a little back street pub. Armed
with a pint, I found the only
spare seat next to a young man
and started a conversation, during which it emerged that I wrote
for a computer magazine.

"I know nothing about computers", said my companion, a microbiologist, "but I suppose you have one of those Pet things". Whereupon, a fellow sitting on a nearby bar stool interrupted. "Are you in computing? I am half of a software firm writing commercial software for Pets."

"Tm a Tandy man myself." I told him, feeling that was almost like a declaration of war. A lengthy discussion followed on the relative difficulties of programming the Z 80 against the SSO2. Neil, our biologist, yowned and sipped his tequila. Until the conversation turned inevitably to Adventure.

"Isn't that a computer version of Dungeons and Dragons?" he asked, suddenly awake again. From that moment, the only lull in the conversation before closing time was when a round was bought. Three enthusiasts could not be stopped.

Adventure did originate from Dungeons and Dragons. It has appeared on many mainframe computers around the world. The original was written in Fortran and required 64K storage plus disc back-up. In this age of the micro, a fairly complex Adventure consisting of about 30 locations and a similar number of objects can be loaded into 16K of RAM

Scott Adams scurcely exaggierates when he proclaims in the instructions appended to the Adventure series, that the player is able to experience an adventure without leaving his chair, the player is able to experience and game suited ideally to compute. I appear to the player of the player ers. A good Adventure can be totally absorbing and the danger of making of false move can become very real, as can the excitement of discovering a new

So, for the uninitiated, what is Adventure? The game consists usually of a logical network of locations which must be explored or traversed. The locations can contain objects, creatures/monsters, and/or treasures, which may be carried and manipulated in sometimes obscure ways to achieve the objective of the aame.

That objective may be to collect treasures, to carry out some specific act — like prevent a time be scape the condition of th

In some games, movement is achieved by means of arrow keys. An Adventure is always words but sometimes may be augmented to a greater or lesser extent with graphics.

The player — unless he cheats by listing the program — has no way of knowing how many locations or objects exist but can plot a logical geo-schematic map of the network to aid him in his travels.

Most Adventures are written in source code, rendering them more difficult to analyse by listing, or disassembling, than to solve

Machine-code games, as well as having the advantage of space economy, have an apparently instantaneous response adding to the dramatic effect of surprise.

If your machine-code Adventure is baffling you and you want to cheat, try breaking, re-setting or quitting the game — without turning off — and then enter this from command mode: FOR I = skstart address of user RAM) TO (end address of user RAM) TO PRINT CHRS PEEK (II): NEXT

That will not give you an instant solution, but all the displayable characters will scroll up the screen, giving you a few good clues!

The most difficult part of writing an Adventure is to establish the theme and the plot. It is really like writing fiction, as it is necessary to have some theme which will hang everything together, while absorbing the

player. When you have hit on a theme, ask yourself if it has been done before. Once you have established your theme and plot. roughly draw he map of the network and place your objects. And the player of the playe



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LIGHTS, ACTION: CUE SIMON'S BIG BROTHER

The musical memory game Simon, has a big brother out this

Super Simon is a deluxe version of the Simon game which made such a big impact in the shops last year. This one has five different games to play and up to eight people can join in.

Super Simon is square shaped, unlike its predecessor and has selectors for the game variations, the number of players and the skill level. Press the large coloured keys to follow the sequence Super Simon's memory throws out and see how long it is before you get the sequence wrong.

Or a more difficult game is to try and follow Super Simon at the same time as its colours light up and it blares out its musical tones.

For more than one person Super Simon can cleverly pick a person to follow his sequence by selecting one of the four colours, red, yellow, green or blue, assigned to each person.

One of its special features, which the original does not have, is an arbitration key. If controversy develops about the result of a game, at the touch of a button, Super Simon will indicate the winner by flashing the right coloured key.

Super Simon is built to last in robust plastic panels to withstand heavy hands. You should easily be able to find the game in most toy shops and department stores. It costs anything between F24-F29.

Apart from the original of this game there is also a baby brother: hand-held Pocket Simon which sells for £9£14. Simon itself now costs £15£20 and is still the most popular of the trio.



DIG FOR VICTORY

Toy manufacturers are still cashing in on the space invaders band wagon.

The hand-held Earth Invaders toy is no exception. It first came out at the beginning of this year as a follow-up to

Computer Games' successful hand-held version of space invaders, called Galaxy Invaders. Flying saucer shaped and made in blue and white plastic with

a large display screen, the game has a microchip inside to program in different difficulty levels.

The aim in Earth Invaders is to defend your general from invading aliens which move around a grid of squares. There are six squares which are safe ground. If you are caught in a square when an alien moves in, you are dead.

Your only defence is complicated and relies on quick thinking and concentrations awell as deaterity. You have to dig holes in the squares around you and wait for an alien to land in one. When he does the red aliens can only be killed by presting both the 'burly button and the correct directional button. But you must do it as soon as the alien lands in the hole or he will escape and destroy you.

escape and destroy you.

You get points for each alien you successfully destroy and bonus points for each phase of the game you complete.

Earth Invaders costs £26.95 and is battery operated.



THE LOGIC OF COMPUTERISED MASTERMIND

The popular logical-deduction peg game of Mastermind was always an ideal candidate for computerisation.

Mastermind suffered from needing two people to play but being deadly dull for the one that set the problem, who could only tap his fingers while his partner thought through the numerous permutations needed to come up with the right answer.

Invicta's Supersonic Electronic Mastermind turns it into an absorbing one-player game with the computer taking over the part of the problem setter—and no distracting table-tapping

either!
The game comes in a hand-held format and resembles a calculator with a liquid crystal display and a small keyboard on which to enter your guesses. It is compact enough to make a good travelling companion and comes complete with a plastic cover to hold your scorceards and a biro.

Skill levels and special set and Skill levels and special set and Skill levels special set and Skill levels special set and Skill levels special set and speci

place. When you feel you have hit upon a sequence which will further your knowledge of the hidden number, hit the 'try' key and the machine checks your effort against the code and returns its two clues. You make a note on your screepad, try a bit of deducing and then have another go. The machine keeps a check of how many tries and how long it took you to work out the

Supersonic Mastermind is battery powered by two HP7s (not supplied) but also runs off the mains and costs £19.95.

DIS ELECTRONIC TOYS ELECTRONIC TOYS ELECTRONIC TOYS ELECTRONIC TOYS



LOTS MORE VROOMM!

model planes which children can a laser beam hit whirl around their heads whilst making "Vrrrroopomm" and

Neeeoooww" sounds For a start these micronrocessor-controlled craft make their own "Vrrrronnomm" noises they

are built along spaceship lines and when pointed at one another

There's a new look to those accurately they actually register

Dads will be as intriqued by these new generation models as the 7-14-year-old voungsters which they are designed to

Called the Starbird Avenuer and the Starbird Intruder the two ships come complete with a cardboard cutout "star base" with a target to fire at from your

They are made of tough plastic to withstand batterings from over-enthusiastic owners and look like spaceships from out of the Star Trek and Blake's 7 T.V.

Both the Avenger and Intruder have laser beam weapons and when the ship is pointed at the star base targets it makes an

exploding sound. The ship's engine noises are realistic and you can engage in dogfight battles with one person holding each ship. When you point the ship's nose upwards the engine sounds as if its power is increasing to full throttle. When you point the ship downwards, the engines slow down to

come into a landing. If it is 'hit' by the enemy, your engine dies for a second or two before being stirred back into action Both cost £15 and are from the stable of Milton Brad-

What makes these toys stand apart from other hand-held planes, that you can buy, are the sounds. No other toy has the same sound effects incorporated in them. They run on a 9 volt battery (not supplied).



WATCH OUT! NEW FASTERN ADDICTION The Japanese have moved on

from digital watches to produce an incredibly addictive series of game watches. There are six in the series.

each about the size of a credit card and designed to fit in your nocket - but it is unlikely that they will spend much time there. The liquid crystal display

screens show the game in progress and provide accurate time at the press of the button.

Although compulsive the names are rather morbid in nature, with titles like: Fire, Vermin. Headache. Manhole. Lion and Ball. In the game Fire, for example the aim is to catch babies - as they leap from a flaming building - on stretchers. If you miss, the baby dies and is chalked up at the top of the screen as an angel.

Each game has two versions - fast and slow depending on your skill. You get three lives and as long as you have a life left you can work up your score. The tiny toy records the top game score

If the idea of burning babies does not appeal to you, try saving a parachutist from dropping into a shark infested sea, or saving a man from being beaten to death by heavy tools raining down on his head

He is only safe when he is inside one of two doors on either side of the screen and you get a point whenever he goes inside. But beware, just when you think you are safe the door slams shut in your face.

The original games are only displayed in black and white and cost £17.95. The latest versions come in colour, are slightly larger and more expensive at £21.95.

The series is called "Game and Watch" and is marketed by Computer Games through a variety of electrical and toy shops.

INVADERS ON HAND The original hand-held Space Invaders which kicked off the craze in the home is still selling well and looks set to do the

some this Christmas The plastic built game was designed to imitate the space invaders arcade game and cash in on its success. After A. A. Hales of Leicester brought it into this country other manufac-

turers took up the idea. The aliens rain down in rapid succession and become faster and faster - and more numerous - as the game progresses. There are two levels, for the "beginner" and the

"expert" and the game comes complete with the familiar grunting sound effects. It runs off six HP7 batteries. Other relatives in the Space Invaders family include Astro Invaders. In this you have to defend yourself from aliens, bombs, missiles, galaxy ships and moving stars.

THE PORTARIE **GAMES CENTRE**

The versatile hand-held electronic game centre Microvision, has had two extra cartridges added to the range for this Christmas.

These portable games follow in the hand-held space invaders vein but are not as sophisticated. There is a "mother" unit with a cartridge which you have to buy in the first instance.

the cartridge is fitted. The games ferent screen to fit in with the and other shops selling electrical currently available include: game's theme and is ready for leisure goods.



Like the T.V. games centres Blockbuster, Shooting Star, the idea is to slot cartridges for Ten-oin Bowling. Pin Ball, the or with another player. The initial

At the top of the master con- version of Space Invaders). sole is a small screen on to which
Each game cartridge has a dif- department stores toy sections

the main unit. The actual unit is quite large and made of strong plastic. The manufacturer, Milton Bradley, says it will easily go into a pocket but I have my doubts. It will certainly fit into a briefcase without any trouble.

Although there is nothing else like this game on the market, it does not live up to its competitors in the hand-held field. Because the actual screen is so small the game is limited and sometimes difficult to see.

You can either play by yourself different games into the master popular strategy game Connect 4 cost of the console and cartridge console which is microprocessor — and the latest additions, Sea ranges from £29 to £39 while the Duel and Space Blitz (yet another cassettes alone are £9. Microvision can be found in most

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MY INTEREST IS

BENEFITS AND PITFALLS

IF YOU are thinking of acquiring a home computer, the easiest decision you will have to make is whether or not to buy it in kit form. Kits, as an idea, are a great advantage to hobbyists as they offer a greater range in

what is usually a small budget. The reasons for choosing one computer over the others are dealt with in another section. Here, I will be dealing with the problems of kit building including special tips on certain machines as they crop up. Some kits have pitfalls for the unwary. and I will hopefully cover them before anyone gets caught! There will also be notes on faultfinding and repair for those who

have already been caught. Undoubtedly you will benefit from building your own kit. Not only will you be better prepared for larger projects, but also you will learn a good deal about the system and how it works.

You must, however, be prepared to spend a lot of time in constructing the kit, and perhaps even longer in getting it to work. Someone who has done little or no construction work before can expect to spend 4-5 hours on even the simplest of kits.

Remember that the components. not the kits, are guaranteed by the makers, so you will have to pay them to put it right if it is your fault. However, if you stick to the instructions, take care over soldering and select the correct components, you should have no trouble.

Once you have decided on a kit, the next step is to get the necessary tools if you do not already have them. They really fall into two categories - essentials and extras

The essentials are soldering iron, solder and cutters. The extras, which you will need if you are to get a professional and reliable finish, are pliers, a form of desolderer, either a small solder sucker or solder wick and a steady pair of hands.

The soldering iron should be

mains-operated, unless you can afford a temperature controlled one, with a small bit for light work. It should be rated at around 20 watts, and definitely no more than 30 watts, as this will tend to destroy components through overheating.

THOT

The solder should be of a fine multicore flux type of 22 gauge preferably. This type does away with pots of flux.

The cutters are needed to trim the ends of the soldered-in components. They should be side cutting and quite light to get a smooth finish on the underside of the board.

The pliers will be needed to bend components to fit into the board This can be done with small fingers, but is often unreliable and causes stress in the components.

The desolderer is useful when too much solder has been put on a joint. The solder sucker does what its name suggests, and the wick is a woven copper strip which, when heated and pressed on to the joint by the iron, draws the solder off. Very useful for

beginners. If you are going to be any good at construction, you will need a steady pair of hands. Funnily enough, women and children make the best solderers! Do not give up, though, if you are in

neither category!

FOLLOW THE INSTRUCTIONS

With all the good kits you will find comprehensive instructions for assembly. If you don't, ask, Most of them tell you to read them first. Do so! Even if you are an expert at construction, the order in which you assemble the components may be important.

So long as you read and follow the instructions, you should have no trouble with identification and assembly. If you are not used to soldering, this will be the point at which you will fall down

Most kits advise you to build up the components on the board in layers, so that when all of one lot — say, resistors — are in, you can turn it over and place it flat on your working top. This allows you two free hands to solder with and ensures that all components are flat on the board.

Transistors, however, should be raised as much as a quarterof-an-inch off the board and soldered with care as they are easily destroyed through overheating. This also goes for the other components, although these are not so critical.

There is no hard and fast rule about soldering. If in trouble, seek advice. Do not continue if you feel unsure. It will cost you dearly in time and money if you make too many mistakes.

Have fun while you are building your kit, as it may not last. Once you have finished it, everyone else will want to have



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WIN OUR CHAMPAGNE

Two bottles of champagne are up for grabs on this page every month. The first correct answers out of the hat for both the Mind Routines problem and the crossword on 15 November will have bottles of champagne rushed to them. Ian Pedder's Mind Routines problem will test both your ability to think through a puzzle and set it out as a program. These lend themselves to solving by program. If you are more literary minded try Nevera's Crossword and see how you get on.

• For details of Computer & Video Games competition rules see page 20.

NEVERA CROSSWORD

- 1. Effervescent ordering (3,6,4) 6. COBOL abbreviation For
- game man (3) 8. Incremental pests (5)
- 11. 12 when associated with a
- star on the Horizon (5)
- 12. DEC mainframe software Greek to the Pet (5)
- 13. Atari Computer recording equipment initially measure
- 16. Enjoyable 3 (3)
- 17. The tops in binary (3) 19. What to do in a Grand Prix
- game to reset itself (5)
- 20. Count illicit contents of a procedural controller (5)
- 21. 3 Tree bit (3)
- 22. Sounds like fun on the IBM
- mainframe (4) 23. Stop the I/O transfer unit (5)
- 24. Single example of 17 (4)
- 25. Alternative condition for one (2.2)
- 26. A rap ends vices which revolutionised the video games scene (5,8)

- 1. Conditional companions
- 2. Single bit restructured to lure (4)
- 3. Primary purpose RND (5.8)

· vedice Q

The four planets negrest the sun have perfect circular orbits around the sun as a centre point. Their orbit periods are given in the table below:

No. of days for one orbit

Mercury	87.97
Venus	224.64
Earth	365.25
Mars	686.79
They are currently	all in a
straight line with the	sun.
(1) When is the nex	t time that

three of them will be in line with the sun again? (2) Which three planets are

Screen feature From the Cu. Fe. Co array members

- - 5. Text editor widely used amongst student ecologists (4)
 - 6. Hub of the computerised pea packers (8) Small but highly esteemed
 - character (2) 9. Meaty sounding constant (2)
- Dead Sea? (8) 14. Make the program go fast
- 15. The first record on a disk?
- 18. Hex 50. Bingry 1010000, INT (4*20-1) For the present time
- 23. Word pieces (4)

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BY GARY MARSHALL

THE interest and compulsion of most computer and video games lies in the appeal of their graphics. There are basically three ways to present the state or results of a games program: with numbers, with words or graphically

colly. While numerical computation is undoubtedly necessary during the course of any reasonably complex game. By its bound to become rather dull sooner or later. To present them in words is better, but books are better for reading from than video screens. A picture is worth a thousand words, and graphics are much them the other distributions and computations.

Most microcomputers, including the Commodore Pet, Sharp MZ-80K, Tandy TRS 80 and Sinchior ZX80 and ZX81 have a set of graphics keys on their keyboards. With these keys a pictorial display can be typed out in the same way as a paragraph of text. To make it easy to produce a graphic display from a program, these microcomputers also have what is called a class have what is called a

memory-mapped screen. The idea of a memory-mapped screen is that each character position on the screen that is, each position is screen that is, each position in which a letter, number or graphic character can be placed is mapped to a location in a specially reserved part to be a second of the screen of the screen of the screen of the screen of memory. He appropriate of memory, the appropriate character automatically appears in the corresponding screen position. So producing a graphic diaplay is reduced to a memory the

management exercise.
Some machines, including the
Apple and Acom Atom, provide
explicit drawing commands. The
fundamental ones are "MOVE"
and "DRAW". The former permits
a drawing position to be established, while the latter causes a
line to be drawn from the current

drawing position to a specified position. In terms of drawing on paper with a pen, these commands are equivalent to movime the pen above the paper, leaving no trace, to position it. And moving it while in contact with the paper so that it draws a line as it moves.

The MOVE and DRAW commands allow the programmer to work in terms of screen positions, which is more natural than manipulating memory locations.



The way in which screen positions are mapped to memory locations for the Pet is illus-trated in Figure 1. The Pet screen has 25 rows, each with 40 column positions, so that a character may be placed in any of 1.000 positions on the screen. These screen positions are mapped on to the memory locations starting from the one with address 32768. As shown in the figure, they are mapped by rows. To place a character on the screen in a position whose row and column are given, we need to work out the address of the corresponding memory location. A little thought should confirm that if the position at the top left of the screen (in row 1 and column 1) corresponds to location 32768, then the address of the location corresponding to the screen position in column C of the top row is 32768 + C - 1 while, generally, the address of the location corresponding to the screen position in row R and column C is

32768 + 40*(R - 1) + C - 1 The Basic instruction which enables displays to be produced using memory-mapping is the "Poke" instruction. On a Pet, the instruction

POKE 32768, 42 causes the number 42 to be stored in location 32768, so that automatically the character whose code is 42 (an asterisk)

appears at the top left corner of the screen.

In this way the tools required to produce a display on a memory-mapped screen are the memory-mapping formula given above and a table of the codes for the available graphic symbols.

The screen size and the area of memory mapped to the screen vary for different machines but with a knowledge of the appropriate values for a particular machine, the formula given for the Pet can be amended.

A space invader can be plotted near the centre of the Pet's screen using the following instructions: P = 33268

POKE P – 1, 255: POKE P, 247:

POKE p + 1, 127 POKE P + 39, 255:

POKE P + 40, 249: POKE P + 41, 127



Figure 2 is a line drawing of an invader. Whatever you think of the likeness, it demonstrates that a drawing of one can be made by joining a set of points by straight lines. By varying the positions of the points, or adding more points, it is possible to obtain a more convincing, or even a more caesthetically pleasing, version, version.

BASIC

By MOIRA NORRIE

You do not need to be able to program to make good use of a home computer but if you can feed instructions to your machine it will be that much more rewarding.

In this series we are going to teach you how to program in Basic, the simplest and most widely used computer language available.

There is a myth built up around computers that only a mathematical genius can understand them. But even 10-12 year olds with no particular skill with figures are among the keenest home programmers these days.

Anyone can learn Basic, you do not need any previous computing experience or even have your own computer — although that would obviously make it more interesting.

If you already have a microcomputer and have learnt how to use its version of Basic you have a head start on the beginners but do not turn the page just yet. Each microcomputer has its own Basic quirks and different functions which make it incompatible with others of its kind.

This series will help you understand some of the functions printed in a different machine's program in the program of the most out of this magazine.

At the end of this series, you will not only be able to write your own computer programs, but also understand other people's programs. We will encourage you to convert these other programs to run on your machine.

How to write games programs will be introduced early on but remember that you can write programs for anything: from keeping a check on your bank balance to storing names and addresses for your Christmas card list.



WHAT IS A COMPUTER PROGRAM?

To get a computer to do something for us, we must give it a list of instructions. This list of instructions is called a computer program. In order that the computer may understand our instructions, we must write them in a language that the computer will understand.

Unfortunately, English is too complex a language for it to understand, therefore we use a specially devised computer language. The computer language we will use is called Basic—this stands for Beginner's All-purpose Symbolic Instruction Code.

There are slight variations in the versions of Basic available on different computers. I will describe the standard version and, when necessary, point out the differences for a number of computers.

GETTING STARTED

First you will have to switch on your computer. Some computers will automatically be ready for you to converse with them in Basic, but with others you may have to go through some pre-liminaries such as loading something from a cassette tape that will allow the computer to understand Basic.

Often computers will give the response "READY" so that you know that you are in Basic. Once

you have reached this stage you will be able to type in a Basic program.

A VERY SIMPLE PROGRAM

We will start with a very simple program which consists of only two instructions — one per line. 10 PRINT 2+3 20 END

Each line of a Basic program begins with a line number — the "10" and "20" above. These line numbers determine the order in which the instructions will be obeyed. The computer starts with the instruction with the smallest line number and finishes with the instruction with the largest line number.

You may type in your instructions in any order: the computer will automatically sort them according to the line numbers. It is not necessary that the line numbers go in steps of 10 as I have done above. However, it is fairly common programming practise as it allows for later instructions to be inserted.

Try typing the above program into your computer. Remember to press the key marked "Return" (or "Newline") at the end of each line typed into the computer.

If you make a mistake when the property of the property of the property of "Rubout" which can be used to erase the last character; typing the key repeatedly will cause it to work back along the line erasing one character each time the key is pressed. On the Sinclair computers, you do not have to type in the letters individually as there are keys which, when pressed at the appropriate point, will type the whole of the special "keywords" such as "PRINT".

With some of the microcomputer systems, the "END" instruction should be omitted. These include the Sinclair and the

Once you have typed in your Basic program, you can then tell the computer to obey the list of instructions — you do this by typing the command "RUN" and then "Beturm" again.

The above program tells it to calculate 2+3 and then print the answer. You should therefore find that the number "5" is

printed.
The computer will then print the response "READY" to let you know that it is ready for you to give it another command. If you then it will again perform the list of instructions. You could type the command "IJST" in which case it will list your program—this is useful in checking what your program looks like at any your program loow "edit" your program.

EDITING YOUR PROGRAM

Often you will want to change your program in some way — then you say that you are "editing" your program.

If may be that your program does not do what you wanted, in which case there is an error in which case there is an error in the program.—this is often referred to as a "bug". You will hear people say that they are "debug-people say that they are debug-that they are trying to get rid of their program are nown of their program may be correct but you want to amend it in some way. In either case, you will have to edit your program in the pro

Editing Basic programs is very simple. There are three types of change you might want to make. You might want to change a line, add a new line or delete one of the current lines.

To change a line, you simply type in the new version of the



line. Thus, if I wanted to change the previous program so that it multiplied 2 by 3 instead of adding, I would type 10 PRINT 2*3

The old version of line 10 would be replaced with the new version of line 10.

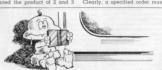
To insert a new line, you type the new line and the line number will determine where it is inserted in the program. If I now typed

15 PRINT 2+3
I would have a program which printed the product of 2 and 3

By using these operations we can perform a whole range of arithmetic calculations. E.g. 4.2-3**2/6

In the first of the above examples, there is a "sed" number one that contains a decimal point. In some versions of Basic only integer numbers are allowed—those that do not contain a decimal point. There will always be a limit on the size of numbers that your computer can cone with.

In the second example, the computer is faced with a choice — will it do the addition or multiplication first. It is does the computer is the computer of the computer is a second computer of the computer of the computer of the computer of 25. However, if it does the multiplication first, it will get "25" which is 10, and then computer of 25. However, if it of the computer of 25. However, if it of the computer of 25. However, if it of the computer of 25. However, if it of 25. Howev



followed by the sum of 2 and 3.

To delete a line of your program, type the line number then press the "Return" key.

Some computer systems provide you with a cursor that can be moved about the display screen so that you can actually indicate individual characters that you want to change. This would save you re-typing the entire line.

SIMPLE

Note that an "" is used in the above example to indicate multiplication. The remaining arithmetic operations are sub-traction represented by "" division represented by "". Exponentiation represented either by "s" or by ". Exponentiation means calculating powers of numbers e.g. 3**2 is equivalent to 3'.

be laid down for such a situation so that computers will always arrive at the same answer.

NEXT ISSUE

If you are familiar with a calculator, you will readise that anything we have done so far could be achieved by a simple colleulator. Next month, I will cover some of the features of Basic that make use of the fact that a computer is more powerful than a simple calculator. These will include the use of "variwill include the use of "varimore general, and "loops" so that you can repect aclauditions for different values without having to re-RUN your program.

NEXT ISSUE

An adventure with real gold for the first solver. Manchester based Mr. Micro's Gold Rush game had inquiries from keen adventurers long before Commodare's VIC-20 Computer was available

This original program costs £16 and should be available from any VIC dealer. I have no doubt that soon hundreds of VIC owners will be burning midnight phasphor as they take on the challenge of Gold Rush Even the packaging is a wel-

come departure from the usual assette software. Gold Rush is

supplied in a good looking book type format, containing the cassette, the instructions, the claims registration guide and an assay application form. The cards are used for registering your claim to dig for gold in the program and confirm your right to the real gold.

It is the fact that this program offers a bag of real gold which makes the game unique. Some of you may be aware that in the usual adventure type game any nold that you win, instantly disappears when you switch off the computer. With this game when you get the gold you keep it you just have to be first!

The only problem that I can report so far is that finding the hidden word that earns the gold. is going to take a lot of hard

You see the 1849 gold rush consists of not just one game. but what the notes describe as a number of 'challenges'. The first part is easy, since it is a very neat display teaching a little about the real gold rush and giving instructions on how to operate what is described as the "Mr. Micro Time Terminal", This is basically a program which loads another program. A very effective way of overcoming the memory limitations of the standard VIC

The hard part comes next, because the screen then displays a map showing various numbers. The map is of California, and the numbers are sites that may be visited. Each site can only be visited when you know the key.

and you get to know the key by here. For those of you considersolving puzzles or by reaching a ing a computer and fancying your binh score in a game.

This means that at the start you can only go directly to one of three locations. Once you have a VIC, since Mr. Micro have fulfilled the requirements then guaranteed that the minimum you can enter in the keys to play value of the gold will be £150. the next levels, and so on until at Furthermore for every program last you will reach your own gold supplied the company will add

Each time you run the program the keys remain the same so if ram must be regarded as good you like you can re-play the value, even if you do not manage games that you enjoyed. For to find the Golden Word. Many example I managed to gain access to "the Diggins" only after have been incorporated, which I I had realised the relevance of am certain will soon be copied by the Indian Smoke Signals, now I other software writers. Although can select that game straight no individual game that I have yet NEWS

shouldn't give too much away

powers of co-ordination and mental agility the program could

even make it worthwhile buying more gold.

Only one winner but this progoriginal and innovative elements reached would justify high praise

The authors assure me that in its own right. By the way, Mr. the games get better as the Micro estimates no one will player gets better, but we solve it for at least six weeks. After that ...





TIVARISOMAWARESOITWARISOMAWARESOITWARESOMAWARESOITWARESOMAWARE



Some of them don't do quite

There are three types of Green

Things - big Green Things, little

Green Things and eggs. The

hardest to kill being the big ones.

ficult (well I haven't won yet)

since the Green Things seem to

multiply too rapidly - in fact, just

about whenever you stop to do

something. This means it is not

This game is extremely dif-

what you would expect - but I'll

leave you to find out exactly

what they do

dreads - an outbreak of the procreative Green Things on his

On a mission in the space exploration ship Znutar, the computer informs you that the Green Things are aboard.

This is the main game on Acornsoft's Games Pack No. 7 (F10) which also includes Ballistics

You start off unarmed and as you move round the ship you must find the Green Things and destroy them with the weapons you find -only two of which can be carried at once.

Sinclair's six-pack of games for the 7X81 owner with a 16K pack is good value for money at only

The pack, available from Sinclair Research is called, unimaginatively, Games Pack 4 and starts off with Cursor Handling which follows some of the early cursor type programs. The screen is full of numbers, with little attempt at graphics to alleviate the numerical information. The piece of paper tucked into the cassette case gives rudimentary instructions, but the randomness of the throws these are also presented at the beginning of each program on the screen (this applies to all Sinclair games).

The program is fairly long, taking about 3 minutes to load. You being blown up by the alien. are a pilot, you can control the throttle of your craft - keys 1 to 9. and altitude — P for clockwise, Q for anticlockwise, Height, horizontal and vertical velocity, fuel supply, throttle setting, altitude could fix this - rather boring and time are displayed. The really, screen flashes every two seconds as the 'instrumentation' is however this time the attacker is updated. A simple graphic display on screen! Nobody who has so shows height and horizontal far played this game, has won!

pontoon-type game, but played ses to get the correct four with dice instead of cards. It is an interesting two-player game, and

worth putting the plan of the ship on the screen since the Green Things may decide to mul-

In this game, the Green Things will move around so that if you find nothing in one room. Green Things may arrive there later. After a while I found this game at each other and the player who herame a hit tedious herause a number of actions to prove effective had to be repeated. It requires 2K to run in on the Acorn Atom.

appeared to have got my shell to hit the other oun, but it was registered as a miss. When you do get a direct hit the opponent's gun explodes and a huge Christmas tree shane annears in its place while an unrealistic explosion sound comes from the speaker. When numbers are fed in, they actually appear at the bottom of the high resolution screen, however, because the characters are plotted using Basic, they are slow to appear and when entering figures, digits are often missed out.

Finally the Snake program. Snake takes about two minutes to load and requires 2K of propram and 1/2K of screen memory

load and requires 3K of program

and 6K of screen memory to run

in It also requires the floating

The game, as you may have

guessed, utilises high resolution

graphics to print a picture of a hill

with little boxes on each side representing the guns.

is first to score a direct hit gains

a point. The hit has to be accu-

rate since when I played. I

Players take it in turns to fire

point ROM.

In this game, you have to go round the screen eating up numbers between one and nine which start decreasing after a while. When you eat a number a sound is produced and the snake increases by the value of the number. If you eat the wall or your tail the game stops until you hit a key, then the next one

This program, although the shortest and simplest, I found was the most addictive - always method of finding the body from wanting to beat the previous high score. The game starts off easy, but as your snake grows it becomes more difficult since there is more to avoid. I found the keys difficult to use.

If you are one of those who likes a strategy game, then this is worth buying, otherwise stick to space invaders.



game. It purports to be a simple space invaders-type game, where your craft has to avoid Unfortunately, the control keys using A, S, Z and X — are not as obvious or easy to use as the cursor keys would be. A simple modification to the program

Substrike is very similar -Code Breaker is a Mastermind

Twenty-One is a simple game where you have 10 guesnumber sequence.

Finally this cassette has May-

day, which is a space rescue game. A body is adrift in a 7×7×7 matrix. You are given 10 attempts at trying to discover the position in this matrix of the body. There is also a time limit. Once you have 'cracked' the the clues given, it becomes quite

While the games taken individually are not world beaters. this cassette is still good value and no loading problems. A number of different tape recorders were used and none gave

any problems.

COMPUTER & VIDEO GAMES 89



RESOLUTIVARI ARISOLUTIVARISOLUTIVARISOLUTIVARISOLUTIVARISOLUTIVARISOLUTIVARI ARISOLUTIVARISOLUTIVARISOLUTIVARISOLUTIVARISOLUTIVARISOLUTI

RAINERS FROM THE HEAVENS

The arcade game Galaxians has now found its way on to many machines but the US Apple version called Alien Rain takes a lot of beating.

Both the waves of bat-like Martians and the space ship under your control move across the screen very quickly with the block of alien creatures reforming and swooping into a fresh formation ready to attack with alarming speed.

Using the right and left direc-Destroying poisonous sea snakes from an all too vulnerable sub-

tional cursor control key to move the defending ship you have to niftily change direct the spray of missiles fired by the

invading force. Of the four-deep block in the deadly enemy fleet there are three different types to blast with your laser gun. Each type of creature is worth a number of points ranging from 30 through to 50 and sometimes going up to

200 At the start of the game you get three lives, or ships, to play

blown up the game is over. Often it doesn't take long for all three to be exterminated which is frus-

trating but, of course, addictive. To fire at the galactic warriors use the A key. The best tactics to adopt are to belt out a continual onslaught of shots while at the same time moving the defence ship to pick off the galaxians working your way from one side of the block to the oth

ng all the You must keen mos time otherwise th kamikaze type aliens will b you in no time

At first ome easy while chine are sent indiegin with and later in irs sv ping down leaving in

shower of missiles Who was these start flying across the screen the pace hots up and you have to fire at the alien while trying to dodge both his shots and the snace ship.

The biggest scorers are the topmost galaxian (red if you have colour). One of those shot down fra during a swooping dive rakes in 100 points. When it doubles up

with. When those three are with one or two of the smaller ships so that they attack in formation it is worth 200 points. Don't let them fly too low before you fire at them because below a certain level your ouns are deactivated. Don't let these fool you into a false sense of security with their special computerised tracking device feature which makes them home in on your ship. Yet they wait for a few seconds before they attack.

The manic number of 3,000 is reckoned to be a high score and when you reach that you get a bonus ship to add to your fleet. But so fast moving is the game that it is hard to achieve that figure without a lot of practice to nerfect your firing and movement co-ordination. The graphics and sound effects have that air of US In America Alian Rain has

the counreceptly been had

Mk to the nKtainable ete and Pam Computers of Romandale Lancashire and costs £13.95 and runs on 48K

BENEATH THE SEA POISONOUS PERM

marine, while avoiding the deadly minator A sixth alternative is killer whales, requires an awarecalled Special Missions which is ness and dexterity most people the most exciting to play. In the have never had to develop. first five levels the speeds of But then most people have snakes, submarine and tor-

never tried to master the recent addition to the Tandy TRS-80 pedges increase with each. In the Special Missions secrange of games, It is called, simply, Serpents and the aim is to tion the player can select various stay alive as long as possible and levels. The game speed can be destroy as many of the snakes set between one and five, the submarine torpedo and serpent that writhe out from the rocky bottom of the sea bed as you sneeds between one and three can. You have torpedo tubes and the torpedo salvo (the both fore and aft for this purpose, but even these are powerless against the marauding killer

Throughout the game these swim across the sea scape. The serpents keep well out of their way and unless you do too, then the game is all over.

whales

The submarine is controlled by the cursor keys for movement up and down or right and left. For diagonal moves, press the horizontal and vertical keys together. Firing left the "Z" key has to be depressed and for firing right the "/" key must be down. All that is difficult to master when you are using three fingers of your left hand and three on your right hand. So be prepared to really concentrate.

· Serpents has five levels of skill, Trainee Torpman, Budding Blaster, Capable Captain, Desparate Destroyer, Expert Exter-

For an average player set the speeds of all elements on the middle number. To get a high score of dead snakes set the torpedo salvo on the fastest setting and the snakes on an average setting. That way you can just about keep control of your fingers, working six for different operations is no mean feat, with out panicking when you suddenly find yourself dodging rapidly multiplying snakes and killer whales

To destroy the snakes the torpedo must hit them just on the bottom. If they are not killed instantly the snakes split up and regenerate at an alarming speed filling up large sections of the

The game could be visually more exciting as the graphics are quite crude. But the game is good to play and the high degree of difficulty in operating the controls only serves to spur you on to master them.

Available from Molimers, the 16K tape costs £8.75 and the 32K



Video Genie.



Are you a home enthusiast taking computers? If so, the Video Genie is

It's a real micro-computer, not a pocket one, yet it only needs connecting to a domestic T.V. set to

popular TRS 80 16K level 2, the best selling computer of all time. As well as its lower price, the Genie offers an in built cassette deck, 16K RAM 12K ROM with BASIC interpreter, full case. So it is not only excellent value for money, but an ideal "First computer" on which to learn

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SOFTWARE GLOSSARY

A beginner's guide to plain jargon

ALGORITHM A process or set of rules to carry out a task or solve a mathematical problem.

ARRAY A series of items (data or information) arranged to form a meaningful pat-

ARROW KEYS The keys on a computer keyboard marked with arrows. Used for moving the cursor across, or up and down

the V.D.U. screen.

BASIC The most widespread computer language, which is one of the easiest to learn and is used on all microcomputers. BUG A slang term given to a mistake in a computer program which prevents it work-

ing. It can refer to a mechanical, electrical or electronic defect in a computer. CAPACITOR An electronic component

used in computers.

CENTRAL PROCESSOR UNIT The part
of the computer which carries out the
arithmetic and logical processes (sometimes known as "number crunching"),
which information has to go through. It also
exercises final control over the physical
components of the computer system.

CHIP A tiny piece of silicon which holds all the components that make up a micro-

CHR\$ A Basic function which codes a computer's graphic symbols. It is followed by a number in brackets, e.g. CHR\$ (88), which is the coded number of the symbol you want the computer to produce.

COMPUTER LANGUAGES Languages are used to make the computer perform operations. They consist of computer instructions or commands. There are different types of languages for carrying out different tasks, e.g. business, scientific.

CURSOR A small square-shaped mark which indicates where a character will appear on the screen. It can be moved around the screen using certain keys on the keyboard.

DATA OUTPUT PORTThis is the part in the computer from which information can be retrieved.

DATA STATEMENT An instruction in a

DEBUG The process of locating and correcting errors in a computer program.

DIGITAL/ANALOGUE CONVERTER A device to convert information stored in an analogue computer into digital form, so that calculations can be carried out. Most computers are digital. Analogue computers are mainly used for scientific purposes.

DIODE A device that allows electricity to flow in only one direction.

DISC A magnetic storage device. It can be either a hard or floppy disc. Hard discs can usually store more information than floppy discs and are used with mainframe computers.

DOLLAR SIGN \$ See "String"
EDIT Rearranging data to be stored in the

EDIT Rearranging data to be stored in the computer memory.

EXPONENTIATION A mathematical

operation used to calculate powers of numbers. FORTRAN is a computer language writ-

ten in algebraic expression and arithmetic statements. It is thought to be a more precise language. GOSUB A Basic command instructing the

computer to go to a subroutine in a computer program.

GRAPHICS The name given to pictorial representation of data such as plotted graphs, engineering drawing and, of course, computer games.

HARDWARE The general term given to

all pieces of electronic and mechanical devices which make up a computer system, i.e. the actual machines. INPUT Information/data which is fed into

INPUT Information/data which is fed into the computer. INTEGER A number which does not con-

tain a decimal point, i.e. a whole number. K A kilobyte of memory. LANGUAGE See "Computer Language" L.C.D. (Liquid Crystal Display) A display

L.C.D. (Liquid Crystal Display) A display containing liquid crystals which light up when electricity touches them. Used in calculators and watches.

L.E.D. (Light Emitting Diode) Provides a simple display and consists of an electron tube which lights up when electricity is passed through it. Used as an alternative to liquid crystal displays.

LINE NUMBER Refers to the number assigned to a line or row of characters contained in a computer program.

LIST (ING) This means to print a line for each item of a computer program. You can either call it up on the screen or, if a printer is attached to the computer, you can get a printout of the program you want to list. Useful to check programs.

LOAD Putting information from auxiliary storage into internal storage of a computer. It can be either a complete program or any data. When you load a program you put the contents of that program into the computer's memory from storage either on a disc

LOOP A Basic function referring to the repeated execution of a series of instructions for a fixed number of times.

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SOFTWARE GLOSSALY

A beginner's guide to plain jargon

MACHINE CODE The term used to refer to symbols or numbers assigned to parts of a machine. It is the same as operation code which is the symbol telling the computer which operation to perform. When a game is written in machine code it makes every-

thing move much more quickly.

MAINFRAME COMPUTER The jargon word used to describe a very large compu-

ter.

MEMORY MAP A printout provided to aid in processing scattered program fragments in the computer's memory. You can also call up the data on the screen.

MIGROCOMPUTER A tiny computer (as the name suggests) consisting of hardware and software. The main processing blocks are made of semiconductor integrated circuits.

MICROPROCESSOR Another name for a chip.

MINICOMPUTER A small, or medium

sized computer. It has less memory capacity than mainframes but more than micros.

NUMERIC KEYPAD This is the section of the computer's keyboard where the number keys are located.

OUTPUT The information retrieved from a computer, either shown on a screen or printed out via a printer attached to the computer.

PEEK A statement used in Basic which allows you to read the contents of a specified memory address.

PIXEL The basic element of a T.V. picture derived through various types of scanning processes and is used for computer manipulation. POKE An instruction used in most ver-

sions of Basic allowing you to store integers in a specific place in memory. PRINT A Basic command which tells the computer to perform a calculation in a program.

PROGRAM (COMPUTER) A series of instructions fed into a computer which will solve a problem or accomplish an objective.

PSEUDO RANDOM NUMBERS These are numbers which are not real random numbers but which are not real random numbers but are close enough to be used

for statistical testing.

R.A.M. (Random Access Memory)
This is a memory chip which you can load programs and data to and from. There are different sized RAMs capable of storing

READY The word which is shown on the screen indicating when the computer has loaded Basic and is ready for your further instructions.

REAL NUMBER A number which con tains a decimal point.

RESISTOR An electronic component that opposes the flow of electrical current and is used to make up a microprocessor.

RETURN A Basic function and also an important key on the computer keyboard. When used in Basic it is a statement which should always appear at the end of a subroutine. When the key on the keyboard is pressed it tells the computer to carry out the instruction you have just given the computer.

R.O.M. (Read Only Memory) A memory chip which can only be read from and not written into.

ROUTINE A set of coded computer instructions used for a particular function in a program.

in a program.

RUN A Basic function and instruction which the programmer types in when he

wants to execute a program.

SEMICONDUCTOR This is material whose electricity conductivity is between metal and an insulator. Many computers pow use semiconductor memory.

SOFTWARE Another name for computer programs. It can also refer to computer documentation.

STATEMENT An instruction in a computer program.

STRING A connected sequence of characters, words or other elements usually symbolised with the \$ (dollar) sign.

STRUCTURED PROGRAMMING A phrase used as shorthand for a collection of techniques thought to make programming much more rigorous.

SUBROUTINE A computer program

routine that is translated separately.

SYNTAX The name used to refer to sentence structure rules of a programming

Innguage.

TRANSISTOR A vital component of a microprocessor. In fact microprocessors contain many thousands of them.

TRUTH VALUE See value.

VALUE The numerical quantity of a data element and the number assigned to a variable.

VARIABLE A symbol whose numeric value can be changed at all times. It is used when writing programs.

V.D.U. (Visual Display Unit) This is a unit which looks like a television screen, which information stored in the computer memory is displayed on.

Z-80 A make of microprocessor much used in microcomputers.



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